

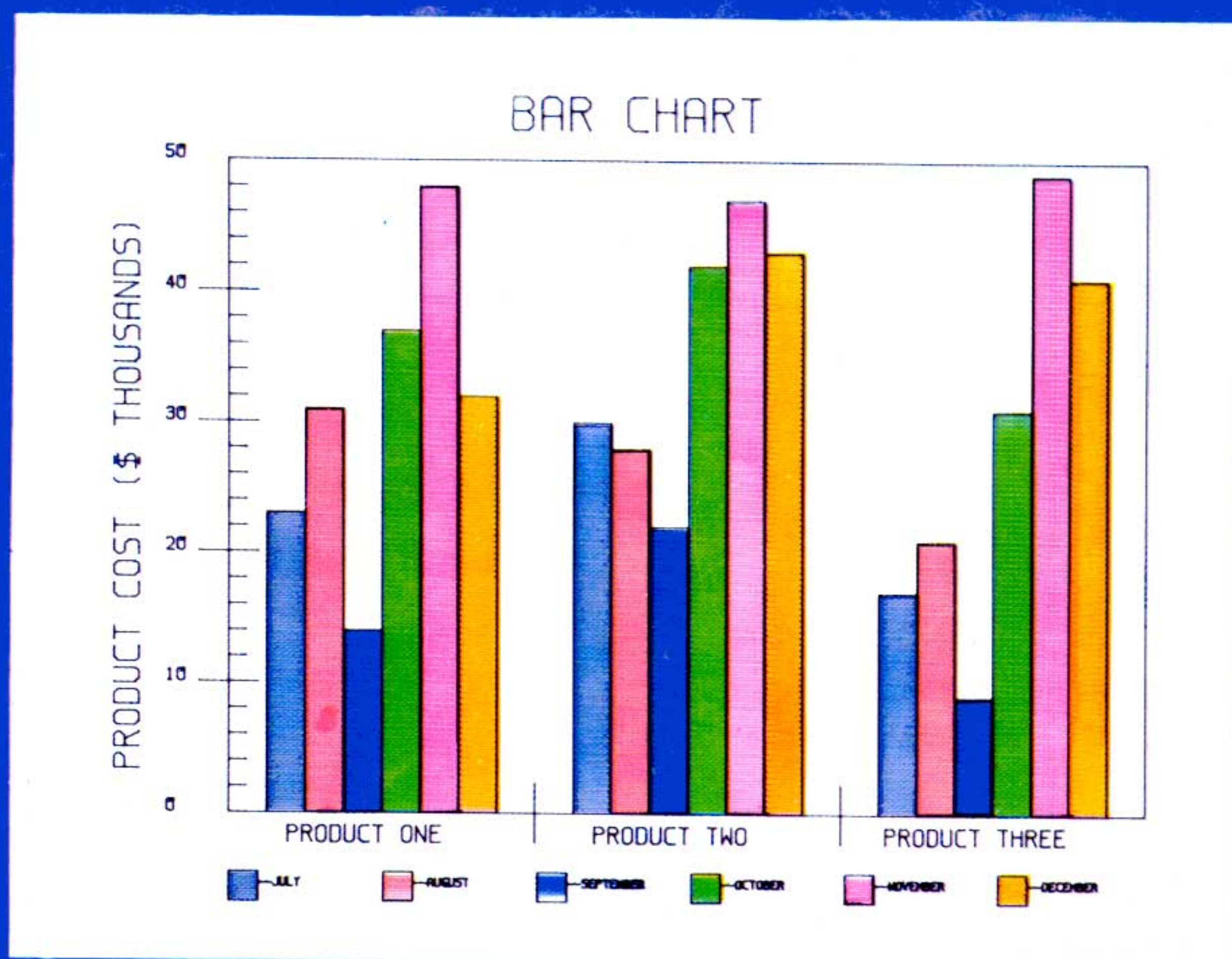
8080 U.S.

THE TRS-80 USERS JOURNAL

Vol. V, No. 9

\$3 per copy

September 1982



Graphing and Graphics:
*Create Visual Excitement
With Your Microcomputer*

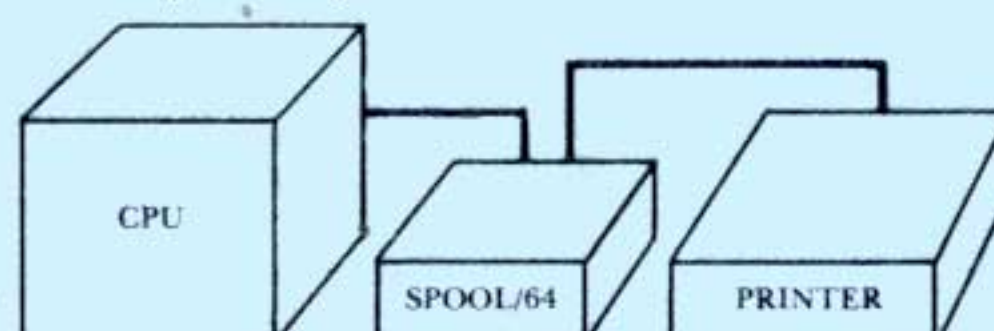


How many times must your TRS-80 stop just to talk to your printer?

Your computer talks faster than your printer can listen. Expensive time is lost forever. SPOOL/64, a 64k byte hardware print spooler, keeps your computer processing while your printer is printing. No more waiting. No more wasting.

SPOOL/64 buffers your print output and transmits the information to your printer at the printer's specific print rate. It buffers up to 13 minutes of print output (at 80 characters per second).

SPOOL/64 plugs directly into both your printer and



computer, accepts input from parallel centronics cables (serial RS-232 available soon), and its user programming feature allows you to download your own programs so SPOOL/64 can handle sophisticated print

routines. And SPOOL/64, used with your software spooler, can give you the highest performance spooling available.



SPOOL/64 utilizes 64k of dynamic RAM, a Z-80 CPU, a 2716 ROM and a copy of the source program for the object code in the ROM is included.

SPOOL/64, priced at just \$399, is the most cost/effective print spooler on the market. Evaluate performance. Evaluate price. Then let SPOOL/64 get your computer back talking to you. Call or write Apparat today for a free brochure. Dealer inquiries invited.

 **Apparat, Inc.**

4401 So. Tamarac Parkway, Denver, CO 80237 (303) 741-1778

"ON GOING SUPPORT FOR MICROCOMPUTERS"



Learn it in a **FLASH**

michael shrayer's

ELECTRIC

pencil

word processing system

- **Easy to Learn** – Like lightning you will be up and running with a comprehensive and sophisticated word processor. Our manual says you can be an expert in one hour, our users tell us it takes less than 30 minutes. The manual's 128 pages are packed with figures, illustrations and examples for the beginner and "old pro".
- **Easy to Use** – With the ELECTRIC PENCIL you process words, not commands. ELECTRIC PENCIL's menus and simple two keystroke commands keeps your mind on your work, NOT on your manual. ELECTRIC PENCIL is so easy to use your secretary will WANT to use it... so sophisticated you'll be glad she did. David Ahl, the editor of Creative Computing says, "ELECTRIC PENCIL 2.0 is the most user friendly word processing package available."
- **Features** – ELECTRIC PENCIL has a 36k+ text buffer (48k disk system), supports disk, tape and Stringy Floppy files (disk version)* and has every major feature you want in a word processor. It is "bullet proof" – Data recovery is a built-in feature. The exclusive DICT-A-MATIC† feature gives your office the flexibility of dictation-word processing without fancy equipment. Your dictation playback is controlled from the computer keyboard.
- **Flexible** – It is the only word processing system that is designed like an operating system. You can add new programs and features to ELECTRIC PENCIL, such as RED and BLUE PENCIL dictionary/correction – with a 50,000 word dictionary (sold separately) – without patches and upgrades. Simply press one of the control key combinations and new additions to your system are instantly available. Add automatic proofing, spelling correction, dynamic print formatting, proportional printing, communications, graphics and typesetting and many other add-on features when you need them.
- **Versatile** – ELECTRIC PENCIL runs on TRS-80 model I and model III computers under all versions of TRSDOS, and NEWDOS without modification or patching (Patches required for other operating systems). It also supports parallel and serial printers as well as single and double density disk systems.

ELECTRIC PENCIL is the choice of thousands - make it yours for only \$89.95 (disk version) or \$79.95 (tape and Stringy Floppy versions). Manual only \$24.95.

ELECTRIC PENCIL is available at computer stores, selected B. Dalton Booksellers and selected independent book dealers. If your dealer is out of stock, order direct (specify disk tape or Stringy Floppy version). Include \$4.00 for shipping and handling. Foreign residents add \$11.00 plus purchase price, in U.S. funds.

*Tape and Stringy Floppy versions support tape and stringy files only

Stringy Floppy trademark EXATRON Corp.
NEWDOS trademark APPARAT, Inc.

TRS80, TRSDOS trademark TANDY Corp.

36



1953 West
11th Street
Upland, CA
91786 (714)
946-5805

† trademark IJG, Inc.

So Far, So Good...



**Your Model III is a fine computer.
So why settle for less than
a fine disk storage system?**

A fast, reliable disk storage system — no other device is so vital to the satisfactory performance of your computer. At Percom we build quality, high-performance disk drive systems. From gold-plated connector contacts to goldcad metal chassis structures. From proven design through 100% reliability testing. Percom disk systems are the standard by which others are judged — the industry's "gold standard," in a sense. And since Percom is the largest independent manufacturer of disk systems for microcomputers, you get Percom quality at very competitive prices. Add-on drives for TRS-80* computers start as low as \$399. Complete first-drive systems for the Model III start at only \$599. Put a quality Percom mini-disk storage system in your Model III. And save.

#1 For Your Model III

Percom TFD drives for your TRS-80* Model III computer are available in 40- and 80-track versions with single or dual heads. Single-head 40-track drives store 180 Kbytes; dual-head 40-track drives store 360 Kbytes. Eighty-track drives store slightly over twice these amounts. Of course these are formatted capacities. The Percom Model III controller handles up to four drives so it's possible to access almost three million bytes of on-line program and data files. You get Percom's OS-80/III Basic language DOS with each first-drive system, and your first drive may be either internal (add-in) or external (add-on). Percom TFD drives work with Model III TRSDOS and other Model III disk-operating systems. First-drive systems are pre-assembled. Installation is accomplished with simple tools.

#1 For Your Model I, Too

Percom TFD add-on drives for the TRS-80* Model I computer are available with the same features and the same quality control measures as TFD Model III drives. As for Model III drives, all Percom Model I drives are double-density rated. Install Percom's popular DOUBLER II in your Model I Expansion Interface and upgrade your Model I to provide the same storage capacity as the Model III.



Watch for Announcement of Percom's Low-Cost Hard Disk System for the Model III!

To order, or for the name of your authorized Percom retailer,
call toll free **1-800-527-1222**.



PERCOM DATA COMPANY, INC.
11220 Pagemill Road • Dallas, Texas 75243
(214) 340-7081

***The Drive People
You get more out of
Percom disk systems.
Expect it!***

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

*TRS-80 is a trademark of Tandy Radio Shack Corporation which has no relationship to Percom Data Company, Inc.
PERCOM, DOUBLER II and OS-80 III are trademarks of Percom Data Company, Inc.

Yes... I'd like to know more about
the best for my TRS-80 computer.
Send me free literature about
quality Percom products.

☐ MODEL I ☐ MODEL III

Send to
PERCOM DATA COMPANY, INC. Dept. 8-U
11220 Pagemill Road, Dallas, TX. 75243

NAME _____

STREET _____

CITY _____

STATE _____

ZIP _____

PHONE NUMBER _____

Expensive Expansion



EXPENSIVE – The LNW System Expansion II and built-in comes with a full 32K of 200ns RAM, RS232c 20 MA current loop serial interface. That's for starters. Next, consider our heavy gauge steel case, power indicator lamp, gold-plated connectors, FR-2 glass epoxy circuit board with solder mask and silk screen legends. Then there is the parallel printer port, screen printer port, real time clock, and extra heavy duty onboard power supply with over current protection, over voltage protection and thermal shutdown. If that's not enough then there is the floppy disk controller, guaranteed operation at a 4MHz CPU speed and our 6 month warranty. Every one of these features is **STANDARD**. This is true system expansion. You get every 'expensive' feature without spending more.

CHEAP – Our price is \$399.95. Any way you compare, features or price, LNW's System Expansion II is the clear winner. The LNW System has been field tested for over two years with thousands of users. It works with any DOS, is 100% TRS-80 Model I compatible and it works 'right out of the box'. If there is any doubt in your mind as to whether you should buy ours or the 'other guys', just ask an LNW owner!

WE ARE #1 – Number one in price, features, reliability, performance and delivery. LNW is committed to 'expensive' features and quality at reasonable prices. LNW is committed to support, thorough documentation, and reliability.

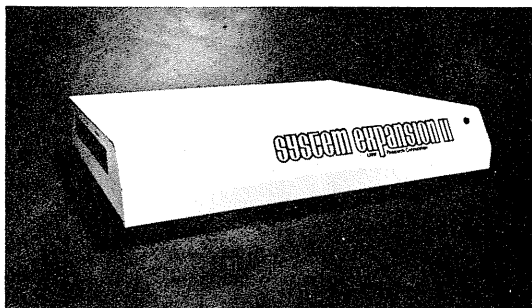
LNW Research Corp.

2620 WALNUT Tustin, CA. 92680
(714) 641-8850 (714) 544-5744

This has made us the number one manufacturer of system expansion units and accessories for the Model I computer. **EXPANSION OPTION** – 8-inch drive capability is as easy as plugging in the LNDoubler 5/8 option*. Now you can have any combination of single- or double-density, single- or double-sided, 8" and/or 5" disks on-line! 8-inch disk storage increased to 591,360 bytes – 77-track single-sided, double-density or 1,182,720 bytes – 77-track double-density, double-sided.

The LNDoubler's unique 5/8 switch allows you to boot from 5- or 8-inch system disks and it's accessible from outside the interface. The \$219.95 LNDoubler 5/8 comes with a double-density disk operating system (DOS+ 3.3.9), complete with BASIC and utility programs... ready to run your software.

Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) – that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage – that's more storage than a Model II or Model III!



3

*8" drive operation requires special cable, 8" double-density requires 3.55MHz CPU speed-up modification or LNW-80 4MHz computer.

© 1982 80-Northwest Publishing, Inc.
All rights reserved. Reproduction for other than personal, non-commercial purposes, or further distribution in any other form, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has been taken in the preparation of this publication, the publisher assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of any information contained herein. Please address correspondence to: **80-U.S. Journal, 3838 South Warner Street, Tacoma, Washington 98409, telephone (206) 475-2219.**

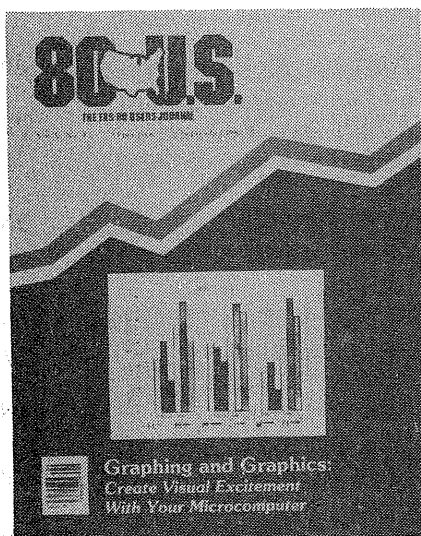
Advertisers: 80-U.S. Journal will accept relevant commercial advertising which pertains to, or is for use on, the Tandy Corporation microcomputers. Write for a current rate schedule.

Authors: We constantly seek material from contributors. Send your material (double spaced, upper/lower case, please) and allow approximately 4 to 6 weeks for review. Programs must be supplied in machine readable form on diskette or tape, clearly marked as to model and operating system. Text files may be on diskette. Media will be returned if return postage is provided. Cartoons and photographs are welcome. Generous compensation will be made for non-trivial works which are accepted for publication. 80-U.S. Journal pays upon acceptance rather than on publication.

SUBSCRIPTION PRICE: U.S.: \$16 for one year, \$31 for two years and \$45 for three years. **Canada and Mexico:** \$25 per year, no two or three year subscriptions are offered. **All other:** \$30 per year via surface mail, \$72 per year via airmail. Two and three year subscriptions are not offered.

ISSN Publication #0199-1035. The 80-U.S. Journal is published monthly by 80-Northwest Publishing, Inc., 3838 S. Warner St., Tacoma WA 98409-4698. Printed in the United States of America.

POSTMASTER: Please send change of address form 3579 to 80-U.S. Journal, 5615 West Cermak Road, Cicero, Illinois 60650. **Second Class postage PAID at Tacoma, WA and at Aberdeen, SD.**



OUR COVER for this graphing and graphics issue features a bar graph generated on the TRS-80 Multi-Pen Plotter 26-1191. Photo courtesy of Radio Shack.

2 80-U.S. Journal

80-U.S.

THE TRS-80 USERS JOURNAL

TRS-80 is a trademark of the Tandy Corp.

Vol. 5, No. 9 — September 1982

ARTICLES

High resolution graphics 14

Model I/III with Epson MX-80 and Grafrax-80 Kenneth R. Smith
Accurately depict any equation. Take advantage of bit addressing these special peripherals.

Drafting on the TRS-80 22

Model I/III, 16K Darrel L. Bartelheimer
Routines to draw arcs, circles and lines.

Two graphs for Model II/16 30

Model II/16 Mike Schmidt
Histograms and regression lines for your printer or video.

Color Computer assembler/disassembler 38

Color Computer Richard Tangeman
Get inside your 6809E. Use this BASIC assembler/disassembler with your Color Computer.

Whiz quiz 46

Model I/III, 16K tape or disk Jim Peyton
An animated graphics multiple choice quiz with ducks indicating right or wrong answers.

PDRIVE 52

Model I/III with NEWDOS/80 version 2.0 Sal Navarro
Make your disks compatible between operating systems with this library command.

Simple Joe

Model I

Ron Goodman

Connect your stereo to your computer and watch Joe sing along.

54

Sweet talker

Model I/III

Edward M. Roberts

An evaluation of the Votrax SC-01. It produces any sound needed for English speech and blends the sounds into a "voice".

57

Integrated accounting

Model III, 48K with 2 disks

80-U.S. Staff

An evaluation of the General Ledger portion of the Plus Computer Technology accounting system.

60

Files and foibles

Model I/II/III

T. R. Dettmann

A complete binary tree file handling program plus "Towers of Hanoi" with animated graphics for the Model II.

62

Pie charts

Model I/III, tape or disk, printer optional

Jose Babilonia

A lesson in converting numeric data into an easy-to-read pie chart. Obtain printer and video output with a minimum of distortion.

78

Basically BASIC

Model I/II/III

James A. Conrad

Processing information with alphanumerics, variables and assignment statements.

92

RENUM IV your III

Model III

Jerry W. O'Dell

Patch the Model I renumber program to run on Model III.

94

Three Color Computer video tips

Color Computer with Extended Color BASIC

Lynn Davis

Switch PMODEs for different effects on the Color Computer video display.

96

REVIEWS

Programs for Beginners on the TRS-80

98

Reviewed by Tony Gitt

TRS-80 Graphics for the Model I/III

100

Reviewed by John Edwards

BASIC Handbook

100

Reviewed by T. R. Dettmann

Defense Command

101

Reviewed by Matt Friedenberg

EDIT

102

Reviewed by Mark E. Renne

FASTBACK

103

Reviewed by T. R. Dettmann

Power Draw

104

Reviewed by Jim Klaproth

DEPARTMENTS

Editorial

4

By Cameron C. Brown

Items at Random

10

By Mike Schmidt

Notes

56

Tandy topics

77

By Ed Juge

Captain 80

88

By Bob Liddil

@ News

90

By Spencer Hall

New Products

108

Bulletin Board

112

Advertiser Index

112

Publisher/Editor-in-Chief

I. Mike Schmidt

EditorsCameron C. Brown
Donald Scarberry**Associate Editors**Terry R. Dettmann
Spencer Hall
Jim Klaproth**Contributing Editor**

Robert W. Liddil

Advertising Sales

Margaret G. Farrell

Promotion

Robert P. Perez

ProductionCatherine D. Doud
Sherry A. Miksell**Editorial Secretary**

Eva R. Jones

Circulation

Kristine E. Schmidt

Accounting

Helen Dalton

Editorial

By Cameron C. Brown

RENEWING?

Check your label to be sure it's correct. For uninterrupted service include your label with your order.

MOVING?

Please enclose your label or write your name and address as it appears on your label.

Name _____

Address _____

City/State _____

Write in new address:

Name _____

Address _____

City/State _____

80-U.S. Journal

Subscription Department
5615 West Cermak Road
Cicero, IL 60650

It is strange to be devoting an issue to one of the weakest areas of the TRS-80 line of computers. Graphics are lumpy. What we call a line makes other computer owners snicker. Low resolution is a fact that we have learned to tolerate (for the moment).

I believe that all of this has taught us something important. Visual representation is a key to understanding. Even the crudest of drawings helps to overcome the fog of words. Histograms, pie charts, bar graphs, arcs and segments serve us well. If the fact you are trying to convey is important, it will stand out like a beacon, even in low resolution black and white.

Over the years, I have seen programs progress from computation of simple averages to complete function graphers. Graphics and games go hand-in-hand. We have become so ho-hum in our search for new and better programs, that if they lack graphics (and even sound), they do not get a second look. In many ways, this issue is a look back to where it all began. The video graphs are as imprecise as ever, but they still serve a purpose.

In reviewing the programs in this issue, I was struck by a relationship that is too easily overlooked. The programmer is an artist. The painter has his oils and canvas, we our SETs and CHR\$s. Both of us are attempting to depict an idea (data) in visual form.

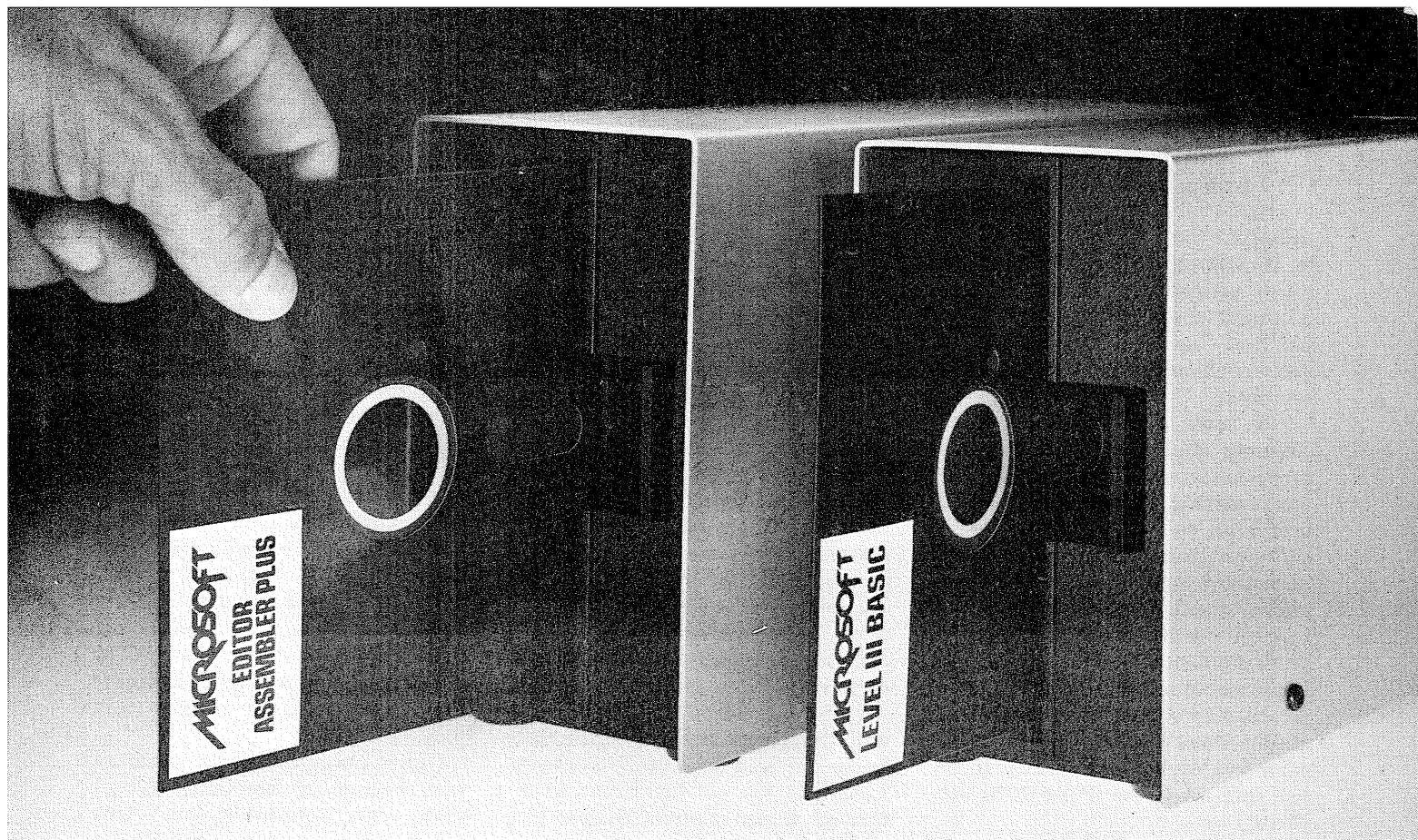
It is true that while early Model I attempts look more like cave drawings, the pictures are improving. Video has become an important link to the user.

Consumers demand good format, clean displays, action and pictures. Programs that just fill the screen with text are becoming rare.

There must be a natural desire to include graphics — just look at the changes that have occurred in the past few years. We can purchase plotters that are multi-colored and dot matrix printers that give output as well as any pointillist. The quality of Color Computer display is just now being investigated. Pocket Computers print figures that used to be sent to an art department for production (at least that is what the Radio Shack ads depict). The Model II graphics codes are quite unique and varied, and they are almost unused in any of the software I have seen. Almost every printer can now faithfully reproduce video graphics and many have a built-in set of characters that are just waiting to be used.

In over 15 years of teaching and studying mathematics, it became very clear that the visual representation of a problem was fundamental to its understanding and solution. Talking about numbers and functions can be a beginning, but an accurate graph tells so much more. It is true that a picture is worth a thousand words. I know what $\sin(X) \div X$ does, but there is still a joy in seeing it accurately displayed.

Radio Shack has just announced a graphics addition for my Model II. I am tempted to spend \$500 so I can draw pretty pictures. Graphics are not a requirement for any of the work I do, but I will probably buy it. Why? Because I am an artist too. ■



More powerful programming tools for the TRS-80™. Now on disk.

Better results. Microsoft's Level III BASIC and Editor/Assembler-Plus are programming tools that help you write complex programs in less time, with less effort and utilizing less memory. Better programs. No matter what your programming skill. And for the first time these tools are available on disk.

Editor/Assembler-Plus. A powerful editing, assembly and debugging tool with many sophisticated features that make writing TRS-80 assembly language programs easier, faster and more efficient.

- Full disk capabilities.
- Assembly directly into memory. No need to save object code then reload for execution.
- Macro capability that allows you to define macros for commonly used sequences of instructions.
- Conditional assembly that allows you to generate more than one version of a program.
- Eight breakpoints at a time for program debugging.
- The INCLUDE statement that allows you to call additional disk files for assembly.
- Other features include extensive operators, automatic origin, symbol table printout, quash command, hex, decimal and octal constants, single step-through instructions in memory, five type-out modes, four type-in radices, plus extensive edit commands.

A more powerful BASIC. With Level III BASIC, you get power to perform tasks in BASIC that used to require assembly language. Plus, new ease-of-use features for your TRS-80.

- Advanced graphics. Develop charts, graphs, even animation in Level III BASIC. Draw a line, an outline box or

a solid box by specifying just two points. Then save and recall it with BASIC commands.

- MENU. One command that allows you to construct an entire menu.
- CHAIN and COMMON commands allow you to call another program and pass variables to it.
- Powerful editing commands such as COPY/TRANSFER, FIND and CHANGE.
- DUMP command that makes debugging easier.
- Time-limit response. New INPUT # LEN and LINE INPUT # LEN commands allow you to set a time limit on response.
- RS-232 output from BASIC. With a single command.
- More. Level III gives you automatic line numbering, 26 user-definable single stroke instructions, and more.

Disk or cassette. Disk versions of Level III and Editor/Assembler-Plus are brand new. Cassette versions are also available with many of the same capabilities.

Talk to your Microsoft™ dealer. Ask for a demonstration of two of the most powerful tools you can get for your TRS-80: Level III BASIC and Editor/Assembler-Plus. On disk or cassette. From Microsoft.

TRS-80 is a trademark of Radio Shack, a division of Tandy Corporation.
Microsoft is a trademark of Microsoft, Inc.
Microsoft Consumer Products is a division of Microsoft, Inc.

MICROSOFT

CONSUMER PRODUCTS

400 108th Ave. N.E., Bellevue, WA 98004. (206) 454-1315
10700 Northrup Way, Bellevue, WA 98004, (206) 828-8080

A friend who has had his Color Computer for only a couple of weeks called one night just before panic set in. He was unable to load any of his taped programs. I knew he was following the correct procedure as he had been using the tapes successfully since he had bought his computer.

The usual suggestions such as cleaning and demagnetizing the tape head were no help. The tapes he was using were purchased programs, so I asked him to type a short program, then save it on a new, blank tape. He did this with no improvement. By now I was out of suggestions and asked him to bring his equipment to my house. Not that I was going to open the case, since he still had warranty time left, but maybe there was tape recorder or cable trouble. We could change these two items and see if the difficulty cleared up.

We set his computer up on a card table and I observed as he began to load a tape he had brought. Eureka! The program loaded like a champ. Other attempts with more tapes were loaded without incident. A short program typed and saved worked as it should.

It was apparent that the problem was either at his house or a loose connection had vibrated enough during the twenty-mile trip from house-to-house. After a cup of coffee, my friend left for home, anxious to try loading the tape at his location.

We had agreed that Pat would call only if there was further trouble after setting up at his house. Later, when the phone began to ring, I didn't have to answer to know who was at the other end. The same old trouble occurred when he tried to load a tape. This time, I suggested that he try a wall outlet in a room where an outlet was on a different circuit breaker. It occurred to me that possibly there was a voltage problem. I waited on-line while Pat hooked up the computer in another room. Even before Pat left the other room, I knew he had been successful, for I heard a loud "ha" before he was even near the phone.

No! It wasn't the socket. The heavy wrought iron table holding Pat's computer was the culprit. Evidently the electrons in the tape

had been pulled out of line by the massive metal table. Even in the second room the loading problem recurred if the computer was placed on it. The last I heard was Pat mumbling something about seeing a cabinetmaker in the morning.

**Leigh L. Klotz, SR.
McComb, MS**

I have just finished digesting the first six issues of 1982 of *The Journal*. I want to say that I enjoyed it very much and I am sorry that I did not subscribe sooner. I feel that I may have missed quite a lot. Anyhow, I certainly will be looking forward to future issues.

I like the format, the editorials and the short utility programs. I know you need revenues to exist but I really enjoy not having to wade through pages of advertising to get to the interesting part.

I don't have (take) the time I would like, nor have the brains for my TRS-80, but I do love to play with it. The short programs — Tiny Typer, to be specific — have a lot of educational value. At least for me. I tried to modify it to work with another program, and I am ashamed to tell how much time I did spend, when I got hung up in those IF...THEN, ELSE loops. I went back to my books and I am still scratching my head and mumbling to myself.

Please keep up the good work and humor us slow learners.

**Wm. Barker Thornton
Lexington, KY**

We like to think we humor everyone. — Ed.

I am writing to address a serious fault I see in the philosophy of the 'UN-NUMBER' program in your April 82 issue. The article admits that this program will not prevent piracy, but merely prevents tampering with 'your' program. Somehow I fail to see why a *legitimate* user of 'your' program shouldn't be free to revamp it, *as long as they give you credit for the program and also note that they*

have modified it so that you won't be blamed for errors that might have crept in.

I believe that Un-number will only prevent tampering by a total novice. And that is just the person who will benefit most from 'revamping' other peoples' programs. The best ways to grow from a novice that has just finished the manual are: 1) to get the help of a more experienced programmer, and 2) to look at, tear apart, and modify the program of a more experienced programmer.

I feel that there are basically two types of pirates, neither of which I condone. #1 is just out to get any program he can get his hands on, and may not know enough to tamper anyway, while #2 will file off the serial numbers despite this program.

I have purchased three monitors with re-number functions. All of them can renumber an "Un-numbered" program into exactly the same program they would have created had it not been un-numbered first.

Computers are becoming so important that we should do everything we can to encourage the newcomer, not throw monkey-wrenches at him that won't even slow down the more experienced programmer, pirate or otherwise.

This is a well written program, and the techniques shown in the Un-number program are just the sort of thing that can open up new vistas for a newcomer. My only argument is that I believe the philosophy behind it was not thought out thoroughly.

Although I paid a good sum of money to take 16 weeks of BASIC programming courses in 1977, I would estimate that less than 25% of my present knowledge is from those courses. About 25% is from other programmers I have worked with directly, and the rest is from tearing into programs that do something I want to do, and finding out how it was done.

I have learned many valuable lessons from the programs in 80-U.S., 80-Micro, Softside, and programs which I have purchased.

For those of you who realize, and I still do, that you don't know it all, I suggest that, on programs that you

Just Write!

PROSOFT

NEWSSCRIPT 7.0

NEWSSCRIPT 7.0 is a high-quality word processing system for the TRS-80 Model I and III. It's based on the editing and formatting programs developed by IBM for use on mainframe time-sharing systems, and takes advantage of the easy-to-use capabilities of the Mod I and III. NEWSSCRIPT 7.0 is intended for use by people with a wide variety of word processing requirements ranging from simple letters and form letters to contracts, large books and dissertations. Although fairly easy to use, its many features ensure that, as your word processing expertise increases, NEWSSCRIPT 7.0 will continue to meet your requirements.

Some of the outstanding features of NEWSSCRIPT 7.0 are:

- Form letters with merging of names and addresses
- Comprehensive manual with hundreds of examples
- Centering, top/bottom titles, indents, pagination
- Underlining, boldface, double-width, italics
- Sub-scripts, super-scripts, proportional pitch
- Generates Table of Contents, sorted Index
- Allows block graphics, special symbols
- Available as an OPTION is right-justified true proportional support for Diablo, Spinwriter, Starwriter, and Qume (DaisyWheel Option)
- Another OPTION is the "PENCIL/SCRIPSIT File Converter for upgrading to NEWSSCRIPT 7.0 (Some features work only if your printer has the mechanical capability)
- Search or replace globally or within a range
- Block move, copy, delete, insert from other file
- AUTOSAVE, WHOOPS, DIRECTORY, KILLS, REPEAT
- Based on IBM's "EDGAR" and "SCRIPT" systems
- Supplied ready-to-run on "tiny" DOSPLUS
- Easily transferred to NEWDOS, NEWDOS/80, LDOS, TRSDOS
- Includes handy Quick Reference Card

SYSTEM REQUIREMENTS: 48K TRS-80 with one disk drive.
Specify Model I or III.

NEWSSCRIPT 7.0

Cat No. 4113-MI or 4113-MIII reg. \$124.95

***\$114.95**

SPECIAL: NEWSSCRIPT 7.0/ + Labels

Cat No. 4115-MI or 4115-MIII reg. \$139.95

***\$124.95**

Mailing Labels Option

Cat No. 4114-MI or 4114-MIII reg. \$29.95

***\$27.95**

Daisywheel Proportional/Option

Cat No. 4116-MI or 4116-MIII reg. \$49.95

***\$46.95**

*FREE SHIPPING WITH ORDER

HOW TO ORDER

Write or phone. Pay by check, M/C, VISA, or COD (add \$1.50 for COD).
(800) 423-5387 (213) 886-9200
Offer expires Sept. 30, 1982. Mention this ad and we pay shipping (UPS ground only).

DISK PROTECTOR CASES

- Holds 50 diskettes
- Attractive yet durable
- Perfect for home or office

Cat No. 2956 (5 1/4")

***\$27.50**

DISKETTE SALE

Take your choice between two top-quality brands of 5 1/4" soft-sector, single-side diskettes

VERBATIM DATALIFE

(#525-01-18158)

Cat No. 1147

***\$30.00**

DYSAN

(#104/1)

Cat No. 3966

***\$38.95**

HV ELECTRONICS

19511 Business Ctr. Dr.
Dept. U9
Northridge, CA 91324

WHEN IN SOUTHERN CALIFORNIA, VISIT OUR RETAIL STORES

9511 Business Center Dr.
Northridge, CA 91324

2301 Artesia Blvd.
Redondo Beach, CA 90277

444 S. Indian
Palm Springs, CA 92262

have legitimately acquired, see if you can find out how something is done that you cannot do. Or, see if you can improve on something the original author did. Or, you may find, that with a few changes, the program can do something that it wasn't originally intended to do.

But, when you do revamp it, give the original author some or most of the credit, depending on how much of the final (does anyone ever write a final version?) program is theirs, and note that you are responsible for changes.

David W. Kukuk
San Jose, CA

Today I purchased my first copy of your magazine. One of the things that caught my eye and led me to buying a copy was the article "Screen Printing with MX-80." Shortly after arriving home from one of the local computer stores, I keyed the program into my Model I (48K, 2-disk) using Radio Shack's Editor Assembler. Two problems immediately came into sight. First of all, I was using the tape version of the Editor Assembler, purchased before adding the drives. With the tape version, I was not able to put in the changes to line 00180 to allow TRSDOS operation. Using either

BFB9H or FFB9H in place of 4152H produced error codes. So, I had to go back to the tape system completely. For right now this is not too much of a problem, but if I ever get a disk version of the Editor Assembler, I will make the changes.

A more serious problem developed after getting the system tape in operation. Although the letters and numbers would print correctly, the graphics blocks would not. My MX-80 has the Grafrax 80 installed (provided at no charge by a local supplier with the MX-80 a couple of months ago). Taking a cue from the next-to-the-last paragraph in the article, I deleted line 00390. This, in effect, takes away the added 32 to the graphics codes. After doing this, the program works on a great number of BASIC programs. Some of the game type of programs, even though in BASIC, will not work. But, this is really not a problem. However, the graphics are printed correctly.

Finally, for someone who is not really into machine language, a hint at using the program: Load the Screen Print program first using SYSTEM. After the second *? appears, just hit ENTER. A SN ERROR will appear, but everything works okay when a BASIC program is entered or run (unless it has

moving graphics as do some of the games).

Glen E. Zook
Richardson, TX

Truman Krumholz's article "Extra RAM" in your March issue, is a good example of how to use the 2K bytes of memory that Radio Shack so graciously left free for "further expansion." I have used a similar device for over two years now for both RAM and EPROM (switch selectable), without so much as a single error. My version of a board using 2716 EPROMs (as well as a board to program them) was recently published in Volume 4 of the *Encyclopedia for the TRS-80* from Wayne Green, Inc., for anyone who might be interested.

Subsequently, I have changed the memory board circuit slightly to reduce the chip count by one, and thought that your readers might be interested in an approach somewhat different to that of Mr. Krumholz's (see Figure 1). This particular board has the advantage of being easier to build, using a total of three chips instead of 12; possibly being cheaper (I paid \$10 for all three chips); and using all 2016 bytes that are available.

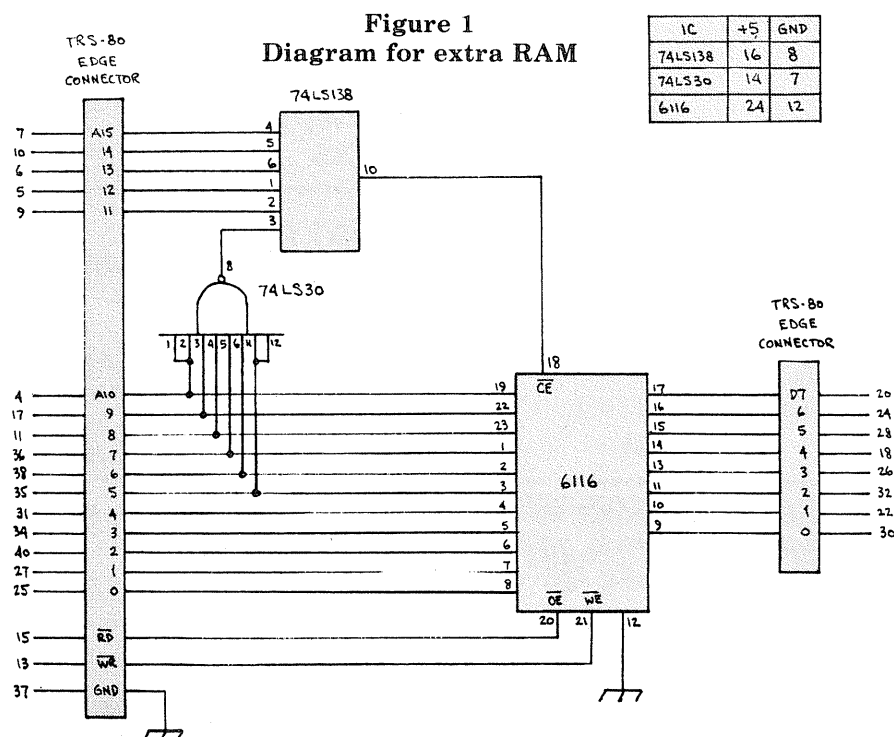
The circuit was wire wrapped using the same type of board Mr. Krumholz specified in his article. The only big difference is that I did not buffer any address or data lines and did not use pull-up resistors. However, I did keep the interconnecting cable short, about six inches. As I mentioned, I have not had any errors thus far (knock on wood)!

The combination of the 74LS30 and 74LS138 decodes all addresses from 3000H to 37DFH, which is all that is available for use anyway. The RAM is one of the new CMOS 2Kx8 static devices, the HM6116LP (200ns) from Hitachi.

Since this is a letter and not a "full description article," I will be more than happy to answer anyone's questions about the circuit if they will include an SASE for the reply.

Steven A. Larson
726 Somerset Way
Augusta, GA 30909

Figure 1
Diagram for extra RAM



This Hand Is A Winner!



- **MASTER** Assembly/Machine language fast. Save months over other methods! Ideal for beginners. Two books plus disk/tape.
- **EXPERTS** The most powerful monitor/debugger ever written for Mod I/Mod III computers.
- **FREE** Detailed information package with coupon, or **See Your Dealer** for demonstration.
- **DEALER** Inquiries invited. Thousands of obsolete monitors can be easily replaced with this product.
- **GERMAN** Language edition available from:

Hanspeter Schmid
Lenastr. 2
6906 Leimen / W. Germany



THE SOFTWARE PLANTATION, INC.

P.O. BOX 44623 • TACOMA, WA 98444

(206) 531-1506

THE SOFTWARE PLANTATION, INC. — DEPT. 8A
P. O. BOX 44623 • TACOMA, WA 98444

Please **RUSH** information about
BUGOUT/PRO to:

Name _____

Address _____

City _____ State _____ Zip _____

Items at random

This issue marks the beginning of our fifth year. I just looked back at Volume I, Number 1. It is hard to believe that a 16-page, all upper case, dot matrix-printed magazine could evolve to this—but it did. There is still a long way to go, and we are constantly taking steps toward a better publication.

Someone asked recently what the major factor in our continued success was. I thought for awhile, and finally came up with just one word—commitment. I think commitment and dedication to the task are our greatest assets. We will do our best to keep it that way.

Naturally, our thanks go to our readers and supporters, without whom we would not exist.

Contest Winner

Our “name the book division” contest winner has finally been selected. It took time and thought—we looked at many cute, funny and interesting entries. The winning entry (there was only one like it) was 80-N.W. Books. It was submitted by Greg Crouch, of Mishawaka, Indiana. It was decided to go with the obvious, since we already had identification in that direction. The \$100 prize is on its way. Congratulations, Greg!

The Case of the Up-arrow

The up-arrow seems to be a real problem with listings published in magazines. There are several ways that line printers print this symbol. It usually doesn't look like an up-arrow at all. Typeset listings are not much better, since many typesetter fonts don't have such an animal.

In our listings for Models I and III, you may find the bracket ([) referring to an up-arrow. You might even find an actual up-arrow. In our Model II listings, you will probably

find the caret (shift 6) in place of the up-arrow. The caret seems to be more standard in computing than the arrow or the bracket. Perhaps we should dispense with the arrow altogether and simply print A*A*A for A to the third power.

Bulletin Board

If you haven't noticed yet, we have changed our Unclassified Announcements to a Bulletin Board. This more accurately describes what it is. It's a place to sell one-of-a-kind items, ask for information, tell others you have information, or track some elusive items that no one seems to have. Use it freely. We will devote up to a page, if necessary, for this service.

Corrections

It turns out that the article called “Vidsave/ASM” in our July, 1982, issue has a machine language listing that will not assemble unless you are using an EDAS 3.5 Editor/Assembler. This was not stated in the article. We have learned (the hard way) that a working machine language program may not assemble under different editors, even though no flaws are present. Our apologies to those of you with Radio Shack editors who obtained 39 errors.

Also in the July issue, the “Togetherness” article has extra lines of code in Listing 1. Delete lines 140 through 280. It seems that the program worked too well and merged with a program already in memory!

In This Issue

Our theme this month is graphing and graphics for video and printers. I even got off my duff long enough to write two graphing routines for the Model II/16. It isn't really fair to call

them Model 16 programs, because there still is no operating system nor BASIC for it, though they do have the Editor / Assembler / Linker available.

Color Computer enthusiasts should take note of the Assembler/Disassembler by Richard Tange-man on page 38. It's written in BASIC and lets you look inside your 6809E chip.

Jim Peyton, whom we have seen from time to time in these pages, has come through with a real belly-laughter. Take a look at Whiz Quiz on page 46, and see if your southern drawl is up to par.

High resolution graphics on the MX-80 is the subject of an article on page 14 by Kenneth R. Smith. Darrel L. Bartelheimer gives us routines to draw arcs, circles and lines on page 22. Making your disks compatible with other operating systems is covered in the article PDRIVE, by Sal Navarro, page 52.

Ron Goodman tells you how to connect your stereo to your computer and watch “Simple Joe” sing along with the music (page 54). Edward M. Roberts presents an evaluation of the Votrax voice synthesizer on page 57.

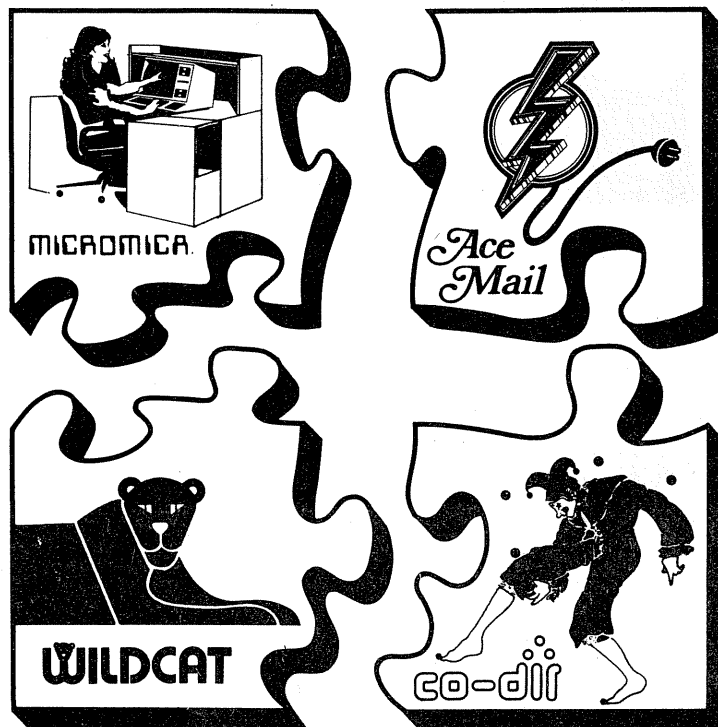
How to make your renumber program from Model I work on Model III is explained on page 94 by Jerry W. O'Dell. Lynn Davis has three Color Computer video tips on switching PMODES for different effects on page 96.

There is more: Pie charts by Jose Babilonia (page 78), Files and Foibles, Basically BASIC, an evaluation of part of the accounting system from Plus Computer Technology, and a bunch of reviews.

It's our fourth anniversary issue—enjoy it and remember that you saw it in 80-U.S. Journal.

Mike

A PERFECT FIT!



AceMail

**automated electronic mail
pick-up and delivery!
\$79**

The unique Automated Computer Electronic MAIL package allows you to send and receive ASCII files from your COMPLETELY UNATTENDED TRS-80! The new, highly sophisticated Version 1.4 works in conjunction with the popular Hayes Stack Smartmodem® featuring auto-answer/auto-dial, RS232C compatibility, 7 LED indicators, an audio monitor, over 30 commands, and is programmable in any language. Written by Mike Moore.



**rapid directory file processor!
\$39**

CO-DIR is a rapid directory file processor which allows you to juggle programs listed on a disk directory using a pair of blinking cursors and a single keystroke. Never type a program name again! Access any directory page or program instantly! Accepts up to twelve commands and has scrolling and word processing features. Written by Hunt Brand/Picotrin Technology, Inc.

WILDCAT

**a remarkable
disk directory catalogue! - \$39**

Wildcat is a remarkable self-commenting disk directory catalogue system which allows disk files to be easily identified, even with obscure or conflicting filespecs. It has a file abstract feature which includes the first line remark of all types of files. Wildcat even permits addition of a permanent remark to object code files for catalogue use. Written by Don Fielding.



**custom modular
computer work centers!
desk - \$159 organizer - \$79**

Our custom furniture features modular engineering for system arrangements and expansion. Each designer-styled desk, shelf top organizer, or printer stand comes in almond, light oak, walnut, or white and presents a unique snap lock system for easy assembly. Desk measures approx. 48"W x 24"D x 27"H. Organizer measures approx. 48"W x 12"D x 21"H. Call for free literature. Designed by Max Fisch.

T-SHIRTS

custom computer t-shirts

Ace Computer Products presents a new line of custom t-shirts designed for the enthusiast. Available in a variety of colors and styles. Call for free catalogue.

1-800-327-2283

call toll free!

Write or call ACE TOLL FREE at 1-800-327-2283 for all software, hardware, furniture, or computer accessories. Florida residents call 305-427-1257. Please use the TOLL FREE line for orders, prices, or literature requests. For technical assistance or service use the Florida line. Mastercard or Visa accepted. Freight added on all orders. Florida residents add sales tax. Prices and specifications subject to change. Software available for most operating systems. Specify model and DOS when ordering.



**FINDING SOLUTIONS
TO PUZZLING PROBLEMS**

ace computer products of florida, inc.

1640 n.w. 3rd st., deerfield beach, florida 33441 voice (305) 427-1257 data (305) 427-6300



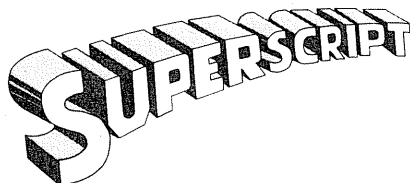
New Releases & Best Sellers For Your TRS-80 I & III

PENETRATOR

By Philip Mitchell from Beam

Armed with missiles and bombs, you must fly your fighter to the enemy's cache of neutron bombs and destroy them. Your mission is in four stages, involving rugged terrain, caverns and manmade obstacles—not to mention enemy radar, missiles and paratroopers. This new departure in arcade gaming allows you to set up your own terrain and enemy emplacements, then save them for future use. Make your mission as hard or easy as you like. Joystick compatible.

16K Tape or 32K Disk, \$24.95



By Richard Wilkes from Acorn

Using your SuperScript modified Scripsit Word Processor and a compatible printer, you can now underline, boldface, insert text during printout, slash zeros, set type pitch, subscript and, of course, superscript! You can even read your directory and kill files without ever leaving Scripsit.

SuperScript comes with drivers for popular serial and parallel printers (now including Centronics 737 and RS Daisy II), and easy instructions for patching to your Scripsit program (does not include Scripsit).

32K Disk, \$49.95 Use Model I Scripsit

Our Most Popular
Unbelievable Realtime 3-D Graphics!

FLIGHT SIMULATION

By Bruce Artwick from Sub-Logic

A graphic tour de force that will truly captivate you. If you haven't seen this brilliant program, you haven't fully utilized the capabilities of your computer! During FLIGHT SIMULATION, you instantly select instrument flight, radar, or a breathtaking pilot's-eye-view. But be sure to strap yourself in—you're liable to get dizzy!

Once you put in some air time learning to fly your computer head for enemy territory and try to bomb the fuel depot while fighting off five enemy warplanes. Good Luck! Please specify Model I or III.

16K Tape, \$25.00 32K Disk, \$33.50

KNOSSOS

By Simon Smith from Med Systems **

Full scale, 3-dimensional escape game. You're in a gigantic labyrinth, shown on the screen as if you are actually in the corridors. You must find the **only door out** to escape the prowling minotaur who will kill you if he can.

16K Tape, \$14.95 32K Disk, \$17.95

**Call about availability of new Med Systems software.

ASYLUM

From Med Systems **

You are sitting alone at 2 AM. Your eyes are bloodshot as you peer into your computer's screen and cry, "I must be CRAZY!" If this has never happened to you, you've never tried ASYLUM. It's Med Systems most ambitious 3-D graphics adventure yet!

ASYLUM places you on a cot in a small (padded?) room. Periodically the janitor lobbs a hand grenade through the window. What you do next could mean escape—or disaster.

16K Tape, \$19.95 32K Disk, \$22.95

Also order DEATHMAZE 5000, Med System's challenging 3-D maze game.

16K Tape, \$14.95 32K Disk, \$19.95

CATERPILLAR

©1982 Soft Sector Marketing Inc.

16K Tape, \$15.95

32K Disk, \$19.95

MYSTERIOUS ADVENTURE

ARROW OF DEATH, PART 1

By Brian Howarth from Acorn

Proper English only! This British import is Acorn Software's first adventure and it meets their reputation for high quality. The vocabulary you use in this adventure must conform to proper English standards—not the barbaric tongue spoken here in the colonies! You and Sorcerer Zardra must restore the kingdom from the engulfing sense of bitterness and ill feeling that forced the ruler to flee the palace.

16K Tape or 32K Disk, \$19.95
Hint Sheet, \$1.00

SEA DRAGON

By Westmoreland & Gilman from Adventure

Underwater adventure is yours as you command a nuclear sub armed with deadly missiles and torpedoes. Guide it carefully through sea mines and underwater mountains; watch out for depth charges being fired by overhead ships... and don't run out of air! Scrolling sea bottom for added excitement.

16K Tape, \$19.95

32K Disk, \$24.95

ARMORED PATROL

By Westmoreland & Gilman from Adventure
As commander of a lumbering T-36 tank you have the firepower to destroy the enemy—if you can find them. They may be hiding behind the houses scattered about, the bleak terrain and your only view is thru the drivers port (your screen). Impressive animation in this arcade

16K Tape, \$19.95

32K Disk, \$24.95

FOREST FIRE DISPATCHER

From SubLogic

A complex strategy game with realistic simulation. You are in charge of a Kentucky forest district. You must save the maximum acreage from fire at the lowest cost. Variables include: acres threatened, number of fires burning, fire spread rate, weather conditions. Challenging; fascinating.

16K Tape, \$24.95

32K Disk, \$29.95

Please specify Model I or III.

THE INSTITUTE

By Jyym Pearson from Med Systems **

Five games in one! You begin in an institution, and must successfully negotiate not just the Institute itself, but four other dream adventures as well. Objects in each dream help solve problems in the next. **Concentrate**, or you may **never** escape the nightmare of the Institute!

16K Tape, \$19.95

32K Disk, \$22.95

Write Arcade Games in BASIC with...

ACCEL 3

BASIC COMPILER

By Southern Systems from Algorix

Ever wish your programs would run faster? Assembly language is one answer. But—even after you spend the time needed to learn Z-80 code—it is a long, tedious process to write in assembly language, and debugging is very difficult. Fortunately, there is another way—compiled BASIC.

In our opinion ACCEL 3 is the best compiler for the TRS-80. It's flexible: works with tape or disk, Model I or III, and requires as little as 16K of memory. It's fast: only a few seconds to compile. It's a memory miser: only a 15-35% increase in program size in most cases.

ACCEL 3 will work under TRSDOS, NEWDOS or LDOS, and there are very few programming restrictions. To save ACCEL-compiled programs on tape you will need TSAVE (sold separately, \$9.95)

Tape or Disk, \$99.95

Over 1500 Programs for TRS-80,

To Order Call Toll-Free
800-424-2738

Visit our other stores:

Seven Corners Center, Falls Church, VA •
W. Bell Plaza, 6600 Security Blvd., Baltimore, MD
Coming Soon to Columbus, Ohio



ATARI 400/800, APPLE & IBM.

MAIL ORDERS: Send check or M.O. for total purchase price, plus \$1.00 postage & handling. D.C., MD. & VA.: add sales tax. Charge cards: include all embossed information on the card.



For Information Call
202-363-9797

4200 Wisconsin Avenue, NW, Dept. 8-209 Box 9609 Washington, D.C. 20016

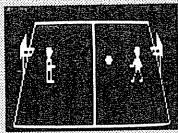
Summer Madness Clearance Sale

(Model I Only) Up To 60% Off



BASKETBALL

Dribble, Dribble



By John Allen from Acorn

You have to be fast to keep up with the action as you try to outscore your opponent in five minutes of one-on-one basketball against a friend or your TRS-80 Model I or III.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

BRIDGE PARTNER

By George Duisman from Personal Software

If you're a novice or bridge expert, this program will help you practice and improve your play. You and the "dummy" play against the computer's skilled defensive hands. And, you can replay the hand to try different strategies, replay the declarer hands against new defensive hands, and rotate the hands. Hands may be saved for future use.

16K Tape, \$10.95*

Now thru Sept. 10 you pay just \$14.98

COSMIC FIGHTER*

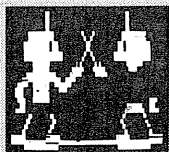
By Hogue & Konyu from Big Five

While fighting off the alien convoys—each more skillful than the last—you must keep track of your rocket fuel or risk explosion.

16K Tape, \$15.95*

32K Disk, \$17.95*

Now thru Sept. 10: Tape \$8.95; Disk \$9.95



DUEL «N» DROIDS

By Leo Christopherson from Acorn

Teach your "animated android" how to wield a laser sword! Leo Christopherson, author of "Android NIM," "Dancing Demon," "Voyage to Valkyrie" and other animations, has developed a new type of animation and high quality sound in this work.

Starting out as a lowly clown, you teach your 'droid to use a laser sword by controlling its movements—advance, attack, even retreat if necessary. Then you enter the tournament against the program's skilled 'droid. Revel in the fanfares of the victorious—or hear the funeral dirges of the defeated! Entertainment for all ages.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

PINBALL

By John Allen from Acorn

Get your flipper fingers ready for action in this real-time, machine language game. Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to shake your TRS-80. Choose from five playing speeds to match your skill. Can you beat your friends' scores? Will you avoid the infamous "Bermuda Square"? Get PINBALL today and find out.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

*No joystick option.

ZORK

From Personal Software

Your greatest adventure awaits you in the Great Underground Empire of Zork! You'll face perils and puzzles as you try to escape from Zork I with the Twenty Treasures and your life. You'll experience challenges in their most realistic sense—you can communicate in complete sentences with the largest vocabulary and range of command options anywhere. Challenges change as you make your moves. Beware mysterious objects and beware the Thief! "Save the game" feature.

32K Disk, \$39.95*

Now thru Sept. 10 you pay just \$35.95

GALAXY INVASION*

By Hogue & Konyu from Big Five

"The rage of the arcades" is now available for TRS-80! Exciting sound effects add to the action as the invaders swoop down to destroy your base. Even while you have your hands full battling the aliens, you have to watch out for the Flagship! Super, graphics, super action, super fun! Joystick compatible.

Disk Version on Tape only, \$17.95



METEOR MISSION 2*

By Hogue & Konyu from Big Five

Six astronauts are stranded on a desolate planet. You must undock from your command module and maneuver your rescue shuttle through the asteroid field to save them.

16K Tape, \$15.95*

32K Disk, \$17.95*

Now thru Sept. 10: Tape \$8.95; Disk \$9.95

EVEREST EXPLORER

By W. Godwin & D. Knowlton from Acorn

Challenge the world's highest mountain without ever leaving home. In this simulation you must buy the manpower and supplies you will need to support your quest. Now the adventure begins as you conquer the elements and terrain, establishing ever higher encampments. Will you reach Everest's 29,028 foot summit? It can be done, but it takes planning, willpower, and luck.

16K Tape or 32K Disk, \$10.95

Now thru Sept. 10 you pay just \$11.98

PIGSKIN

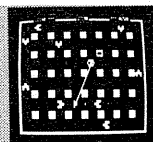
By Laurence, Sothen & Gavenda from Acorn

Play football against a friend or your computer. With graphic display of the field, ball and scoreboard. Choose from 11 offensive plays against your opponents 7 defenses—77 possible, play options! Five levels of difficulty; save the game feature.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

ATTACK FORCE!



By Hogue & Konyu from Big Five

Unlike the usual space "shoot-em-ups," Attack Force lets you control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships.

16K Tape, \$15.95*

32K Disk, \$17.95*

Now thru Sept. 10: Tape \$8.95; Disk \$9.95

GAMMON CHALLENGER

By Daly & Throop from Acorn

There's no other computer backgammon game like this one! Choose one of three levels of play, but don't get too ambitious—Gammon Challenger will put your skill to the test at all levels. For serious players, the "doubling cube" option can be used for added excitement.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

INVADERS FROM SPACE



By Carl Miller from Acorn

A fast machine language approach to this classic (and addictive) space game. The aliens drop bombs and move from side to side trying to overrun your bases. You choose the speed, enemy bomb frequency and accuracy, your number of shots on screen and bases. Unlike most such games, you can move your base and simultaneously fire at the invaders. Full sound effects add even more excitement to the incredible action of INVADERS FROM SPACE. Fun for all ages and skill levels.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$9.98

QUAD

By Charles Asper from Acorn

Ready for 3-dimensional Tic-Tac-Toe? Then you'll love Quad, Acorn's challenging version. Play against the computer or a friend; against the computer, there are 4 levels of difficulty. Or rotate the cube 6 ways to help you and confuse your opponent. 76 different winning 4-in-a-row combinations.

16K Tape, \$14.95*

Now thru Sept. 10 you pay just \$5.98

SPACE WAR

By Device Oriented Games from Acorn

Two-player, real-time action game that lets each player control a spaceship with rotate, thrust, fire and hyperspace. 5 game options (including gravity); 3 playing speeds. Lots of action as you maneuver your craft in an interstellar dogfight, or run for the cover of hyperspace!

16K Tape, \$9.95*

Now thru Sept. 10 you pay just \$7.98

THE PROGRAM STORE • Dept. 8-209 • Box 9609 • 4200 Wisconsin Avenue, NW • Washington, D.C. 20016

Item	Tape/Disk/Book	Price	Postage \$1.00	Name
			Total	Address
			<input type="checkbox"/> CHECK <input type="checkbox"/> VISA	City
			<input type="checkbox"/> MASTERCARD	State
				Zip
				Card #
				Exp

High-resolution graphics

Dot addressable graphing

Model I/III with Epson MX-80 and Graftrax-80

Kenneth R. Smith, Baltimore, MD

It was with some uneasiness that I sold my Model I (Level II, 16K), with its Expando Black Box printer and plunged forward with a new Model III (48K, 2 disk, RS232), an Epson MX-80 printer and a modem. Would it all work? Would I spend a lot of time converting old programs I had written for the Model I? Would I be happy with my new setup?

After conquering some of the small differences between the two models, I am quite happy with my new system. The MX-80, in particular, fascinated me. It printed uppercase, lowercase, all 64 TRS-80 graphics characters, compressed print, expanded print, emphasized print, doublestrike print and featured adjustable line spacing, and adjustable tractors. I was

Still lurking inside the chips, waiting to be called forth, were those enticing high-resolution graphics.

now able to generate listings and reports that approached "letter quality." Using SCRIPUS by Roger Junk, a modification to SCRIPSIT, I could use all the MX-80 features directly from SCRIPSIT. Wow! Was I happy!

Then a microcomputing magazine was delivered. Thumbing through the ads, I saw an incredibly beautiful ad by Epson for their GRAFTRAX-80. Needless to say, I rushed to my local supplier and purchased the kit for \$95.00 plus tax.

Testing it Out

What I got was a plastic envelope containing three EPROMs and 24 pages of documentation. I opened the package and read the documentation very carefully . . . twice. After I decided that I was capable of doing the job myself, I followed the instructions for taking the cabinet apart, removing the old PROMs and inserting the new chips (even though the instructions said I would only find one PROM to remove and indicated I had to cut a jumper wire which was already cut). Anyway, I reassembled the entire thing, plugged it in, and put it in the self-test mode. It worked!

By setting a dipswitch inside the printer, I now had

slashed zeros. I also had italics! Still lurking inside the chips, waiting to be called forth, were those enticing high-resolution graphics. After reading the instructions a few more times, I decided to try those "dot-addressable" or "bit-image" graphics, so I entered:

```
LPRINT CHR$(27) CHR$(75) CHR$(224) CHR$(1);
```

which tells the printer that the next 480 bytes it receives are to be printed as bit-image graphics (more on this later). I followed this with:

```
FOR I=1 TO 480 : LPRINT CHR$(1); : NEXT I
```

After a brief pause, the printer drew a line of 480 dots across the page — in two passes. It did half the line, then homed the print head, and did the rest of the line on the second pass. Success!

The special codes that are sent to the printer are usually preceded by an "escape" character which is not printed, but "tells" the printer that the next byte or bytes that it receives will tell it which mode to switch itself to. In the preceding example, CHR\$(27) is the escape character, CHR\$(75) puts the printer into "480-mode graphics," and the two bytes transmitted to the printer by CHR\$(224) and CHR\$(1) together tell the computer that the next 480 bytes are graphics characters. They do this by the formula $224 + 256 * 1$. If we only wanted to transmit 100 bytes of graphics in this mode, we would use:

```
LPRINT CHR$(27) CHR$(75) CHR$(100) CHR$(0);
```

because $100 + 256 * 0 = 100$. The general formula is:

```
LPRINT CHR$(27) CHR$(75) CHR$(X) CHR$(Y);
```

where X is an integer between zero and 255, Y is either 0 or 1, and the number of bytes to be received is $X + 256 * Y$. Of course, it is necessary that $X + 256 * Y$ must be less than or equal to 480 when in the "480-mode," or an error condition will be created within the printer. If any error occurs, the printer will "beep" eight times and refuse to accept further instructions until it is turned off and reset.

The other line of BASIC:



Summer Software Selection For Your TRS-80 Color Computer



Voyager I

From Avalon Hill

You're on board a spaceship infested with killer robots in this graphic science fiction game. You must clear the 4-level 144-location ship of robots and arm it to self-destruct. Can you do it and escape before you, too, are blown up? High-speed graphics are represented in 3-D perspective representing your eye's view; with instant switching to floor plan maps. Extended BASIC required.

16K Tape, \$19.95



Ghost Gobbler

From Spectral Associates

In this new and exciting version of the popular arcade game, use your joysticks to move your Ghost Gobbler through the maze, eating dots and power pills to score points. 8 bonus shapes, super sound, and 16 skill levels. Extended BASIC not required; joysticks.

16K Tape, \$21.95



Creatavader

By Fred Scerbo from Illustrated Memory Banks

Create your own antagonist, and fire away! Pick your pet target, or use ours: tv sets, killer tomatoes or smiley faces. Use the joystick to fire your cannon and clear the screen. Look out for the secret target defender! Extended BASIC and one joystick required.

16K Tape, \$18.95



Madness and the Minotaur

From Spectral Associates

Classic adventure game with 200 rooms, assorted friendly and dangerous creatures, 8 magic spells and —of course—treasures. The computer obeys two-word commands such as "get lamp" to move you through your journey. You must enter the castle of King Minos, descend into the labyrinth and collect all the treasures you can.

16K Tape, \$19.95

Color Computer Blockade

By Terry Kepner from Interpro

Compete against a friend or the computer in this real-time, full color arcade game with sound effects. Use your joysticks to draw a barrier around your opponent while avoiding the trap being set for you. Requires joysticks.

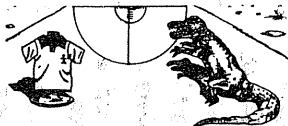
Level I 4K/16K or Level II with Extended BASIC
Tape, \$14.95

Gator Zone

By Scerbo and Jammalo from Illustrated Memory Banks

Revenge on the Preppies at last!! The Preppy Craze has gotten completely out of control. You must journey to the planet "Preptune" to stop the 'gators from invading earth in assorted garment forms. Use your shirt shields and lasers to protect you as you aim the crosshairs and press the fire button on your joystick. Get the gators before they get your shirts! 3 levels of difficulty. Extended BASIC required; joysticks.

16K Tape, \$18.95

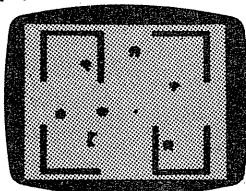


Moon Lander

By Greg Zumwalt from American Small Business Computers

Pilot your spacecraft over the moon's landscape and try to land it amid the mountains and craters. While carefully controlling your fuel consumption, use your joysticks to maneuver your craft and control your velocity against the forces of gravity. Be careful to avoid the asteroids drifting through space.

16K Tape, \$14.95



Robot Battle

From Spectral Associates

Can you dodge the never-ending horde of robots while avoiding the fatal touch of the Android? Realistic voices and 16 skill levels provide a tremendous arcade type challenge. Does not require Extended BASIC; joysticks.

16K Tape, \$21.95

The Super "Color" Terminal

From Nelson Software Systems

Time Share, Smart Terminal, High-speed Data Transfer and Videotex. Turns your Color Computer into a Super-smart terminal with all the features of VIDEOTEX plus much more. Communicate with Dow Jones, CompuServe and computers like TRS-80 Models I, II, III, APPLE, etc. via modem or RS-232 direct. Save the data to tape, or print it! Cuts on-line costs to a minimum.

Disk, \$69.95 ROM Pak, \$49.95

TRS-80 Color Basic

By Bob Albrecht from John Wiley & Sons

Step-by-step guide to the unique color, sound and graphic capabilities of your new Color Computer. No previous experience is required. Teach yourself BASIC—there's a whole chapter on typical programming problems and solutions.

Softcover, \$9.95

TRS-80 Programs and Applications for the Color Computer

By Alfred Baker from Reston

Handy guide to your Color Computer: how to play games, balance your checkbook, use your computer as a teacher, etc. With chapters on color and sound, art and music. Helpful for beginning or experienced computer user.

Softcover, \$14.95

Color Computer Scarfman

From The Cornsoft Group

Use the keyboard or joysticks to move your Color Scarfman through the maze to gobble up little yellow dots while avoiding 5 red monsters. If Scarfman can eat a yellow plus (+), a monster turns blue and can be eaten. Each time you clear the screen, the level and point value increase. Extended BASIC not required.

4K Tape, \$19.95



Scepter of Kzirgla

From Rainbow Connection Software

Real-time graphics adventure game with arcade sound for the color computer. 13 floors of dungeon with monsters, treasure chests, hidden trap doors... even a flying magic carpet! All in your quest to find the Scepter of Kzirgla. Whatever you do, don't get caught in the poisonous gas cloud! Extended BASIC required.

16K Tape, \$16.95, 16K Disk, \$21.95



Master Control

From Soft Sector Marketing

This is a BASIC language program designed to decrease typing time and error while providing direct control of motor, trace, audio and run. With Automatic Line Numbering and a custom key you can re-use or change at any time; plus 50 preprogrammed command keys. Can be used on a 32K system.

16K/32K Tape, \$24.95



For Information Call
202-363-9797

To Order Call Toll-Free 800-424-2738



the PROGRAM STORE 4200 Wisconsin Avenue, NW, Dept. 8-209 Box 9609
Washington, D.C. 20016

Visit our other stores: Seven Corners Center, Falls Church, VA • W. Bell Plaza, 6600 Security Blvd., Baltimore, MD
Coming Soon to Columbus, Ohio

THE PROGRAM STORE • Dept. 8-209 • Box 9609 • 4200 Wisconsin Avenue, NW • Washington, D.C. 20016

Item	Tape/Disk/Book	Price	Postage \$1.00	Name
		Total		Address
		<input type="checkbox"/> CHECK <input type="checkbox"/> VISA		City _____ State _____ Zip _____
		<input type="checkbox"/> MASTERCARD		Card # _____ Exp _____


```
FOR I=1 TO 480 : LPRINT CHR$(1); : NEXT I
```

sent the 480 bytes of graphics to the printer. Each byte was equal to 1, which told the printer to "fire" the bottom print needle at each of the 480 printable positions. A byte of 0 would have fired none of the needles. Even though the MX-80 uses a nine-needle print head capable of printing nine dots vertically, only the top eight needles are used in the graphics mode. Each needle corresponds to a bit in the byte received by the printer. The bottom needle is fired whenever the least significant bit is set. The top needle is fired whenever the most significant bit is set, and so on, according to this table:

Bit 7	Needle 8 (top)
Bit 6	Needle 7
Bit 5	Needle 6
Bit 4	Needle 5
Bit 3	Needle 4
Bit 2	Needle 3
Bit 1	Needle 2
Bit 0	Needle 1 (bottom)

Therefore, if we wish to fire more than one needle in a print position, we must set more bits. For example, to fire all eight needles in a print position, we would need to send a byte with all eight bits set. The byte we would need would be 255 decimal. Remembering that each bit of a byte corresponds to a power of two, we can just "add up" the values for the needles we want to fire, according to this table:

Needle 8	128
Needle 7	64
Needle 6	32
Needle 5	16
Needle 4	8
Needle 3	4
Needle 2	2
Needle 1	1

While this method will work for some simple applications, a more sophisticated method needs to be devised for more complex graphics. We will explore that method a little later on in this article.

The MX-80 also has "960-mode graphics" in which it is capable of printing 960 dots across the page in one line. To access this mode, the special sequence is:

```
LPRINT CHR$(27) CHR$(76) CHR$(X) CHR$(Y);
```

Again, the CHR\$(27) is the escape character and the CHR\$(76) which follows it tells the printer to shift into "960-mode graphics." The CHR\$(X) and CHR\$(Y) that follow tell the printer how many bytes of graphics characters it will receive by the formula $X+256*Y$, where X is an integer between 0 and 255, and Y is an integer between 0 and 3. For example:

```
LPRINT CHR$(27) CHR$(76) CHR$(100) CHR$(2);
```

would tell the printer to expect 612 bytes of graphics characters in the 960-mode because $612=100+256*2$. Of course, when in this mode, $X+256*Y$ cannot exceed 960. The same procedure used in the 480-mode is used for firing the needles in the 960-mode. On printing, though, a full line of 960 graphics is printed in four passes across the page, which really slows things down.

That Fancy Sine Curve

Now, let's investigate the program and techniques used to produce the pretty sine curve in Figure 1. Generally, the method is to set up an array of 480 bytes, one for each print position in the 480-mode. The bytes are then output to the printer, reset to zero, and the whole process is repeated for 90 lines. The variable used to represent the current line is L. Values of L are multiples of 8 from 0 to 712. Within each line, there are eight dots, numbered zero to seven. The variable used to represent the dot number is D. When L and D are added, their sum is an integer between 0 and 719. These are the unscaled values which will be used to form the X-axis of our graph, which will run "down" the page, rather than across it. The Y-axis, on the other hand, is numbered from 0 to 479 (480 bytes, remember?). This means that we have at our disposal 345,600 dots (480 across the page by 720 down the page).

I chose to let 100 dots = one unit on the X-axis (down the page) and 80 dots = one unit on the Y-axis (across the page). By doing this, one unit on the X-axis is almost the same absolute distance as one unit on the Y-axis. Also, the numbers 80 and 100 are easily subdivided to mark axis divisions. Therefore, as we print the Y-axis, every 8 dots = $\frac{1}{10}$ of a unit, and every 40 dots = $\frac{1}{2}$ of a unit. As we print the X-axis, every 10 dots = $\frac{1}{10}$ of a unit, and every 50 dots = $\frac{1}{2}$ of a unit.

Referring to Listing 1, line 150 sets every other dot along the X-axis, line 180 detects when $X=0$ and sets up the Y-axis, and lines 190-210 detect units, tenths, and halves along the X-axis and make tick marks at those points. Line 120 is a safety measure taken to ensure that the printer's internal buffer is empty before attempting to enter the graphics mode. Line 130 sets the line spacing at eight dots per line so there will be no space between lines.

Line 170 produces a value of X between 0.00 and 7.19. Line 220 contains the function of X to be graphed. Line 230 transforms the functional value to a value which is scaled between 0 and 479. Line 240 calls the subroutine at line 5000 to actually set the dot.

The subroutine at line 5000 first checks to see if the number of the byte to be used is between 0 and 479. If not, it returns without setting any dots. If the value of Y is between 0 and 479, the proper byte is ORed with the value of the dot we wish to set, and then control is returned to the main program.

Line 260 puts the MX-80 into the graphics mode to receive 480 bytes of graphics, which are sent out by the FOR...NEXT loop in lines 270-320. Line 280 checks to see if the printer is ready to receive a byte. Line 290 detects if the computer is Model III, and if it is, outputs a byte to port 248 (the printer). Line 300, on the other hand, sees if the computer is Model I, and POKes the

Figure 1
High-Resolution

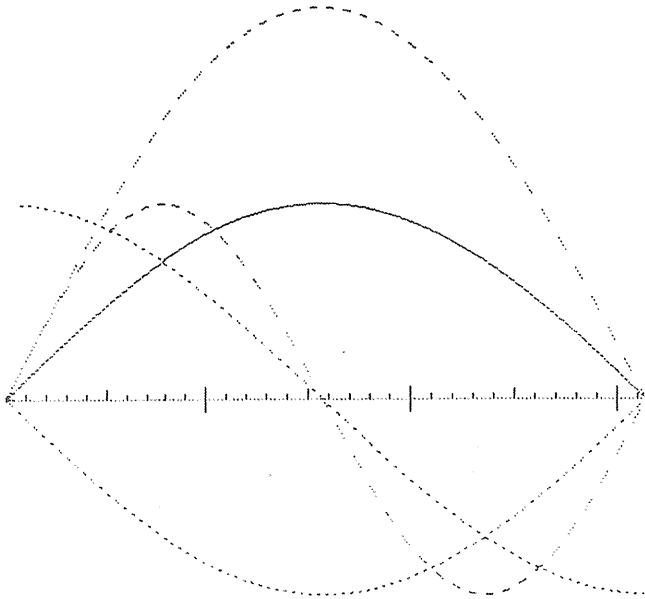
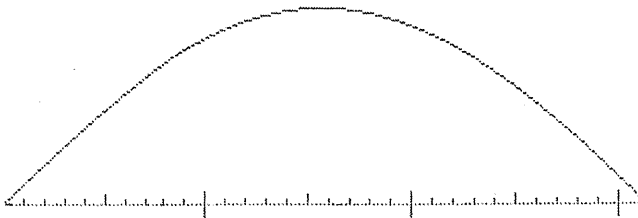


Figure 2
Low-Resolution



byte into location 14312, the printer "latch." Line 310 resets the byte just transmitted to zero for use in the next line.

Playing for Higher Stakes

Listing 2 shows how to produce similar curves in the 960-mode. In this mode, we have available to us 960 dots across the page and 720 dots down the page, for a total of 691,200 addressable dots. The output (Figure 2) will appear virtually the same as the Figure 1 except upon close examination. If you look closely, you will see many more "flat" portions in Figure 1. The curves in Figure 2 will appear to be more "naturally curved" than the curve in Figure 1.

In Figure 2, the sine curve is "solid," and all the other functions are "broken" into pieces of either four dots or two dots. Since the printer makes four passes on each of the 90 lines printed, plotting these curves takes an awfully long time, but the results are truly impressive!

A great deal of time can be saved by "packing" the programs as much as possible and by using integer

variables wherever possible. In BASIC, however, these programs will run slowly no matter what you do. I suspect that the real key to faster high-resolution graphics is the use of assembler language or the use of a mixture of BASIC with assembler language subroutines. That is the project I have put on my "list of things to do" after I get a suitable editor/assembler for my Model III. In the meantime, however, I can still knock out some fantastic graphs!

Program Listing 1 Low-Resolution

```

100 DEFINT A-W 'THIS WILL HELP IT RUN
A LITTLE FASTER
110 DIM A(479) '480 BYTES MAKE ONE LINE
120 LPRINT CHR$(27)"@"; 'RESET MX-80 TO
    DEFAULT SETTINGS
130 LPRINT CHR$(27)"A"CHR$(8); 'SET 8 D
OTS PER LINE SPACING
140 FOR L=0 TO 712 STEP 8 'ONCE FOR EA
CH LINE OF 8 DOTS
150 A(240)=170 'SET EVERY OTHER DOT ON
THE X-AXIS
160 FOR D=0 TO 7 'MAKE COMPUTATIONS FO
R EACH NEEDLE
170 X=(L+D)/100 'X BETWEEN 0.00 AND 7
.29, 100 DOTS/UNIT
180 IF X=0 THEN GOSUB 1000 'SET UP THE
Y-AXIS
190 IF X=INT(X) THEN GOSUB 2000 'TICK
MARK EACH UNIT
200 IF X*2=INT(X*2) THEN GOSUB 3000 'TI
CK MARK EACH 1/2 UNIT
210 IF (L+D)/10=INT((L+D)/10) THEN GOSU
B 4000 'MARK EACH 1/10
220 Y=SIN(X) 'THIS IS THE FUNCTION TO B
E GRAPHED
230 Y = INT(Y*80+240.5) 'COMPUTE BYTE T
O SET DOT IN
240 GOSUB 5000 'SET THE DOT
250 NEXT D
260 LPRINT CHR$(27)CHR$(75)CHR$(224)CHR
$(1); ' SET MX-80 FOR GRAPHICS IN THE 4
80 MODE FOR THE NEXT 480 BYTES
270 FOR I=0 TO 479
280 IF PEEK(14312)<>61 THEN 280 'PRINT
ER BUSY?
290 IF PEEK(293)=73 THEN OUT 248,A(I) '
MODEL III
300 IF PEEK(293)<>73 THEN POKE 14312,A(
I) 'MODEL I
310 A(I)=0 'RESET BYTE
320 NEXT I
330 LPRINT 'ADVANCE TO NEXT LINE
340 NEXT L
350 END
1000 FOR Y=0 TO 479

```



```

1010 GOSUB 5000
1020 NEXT Y
1030 FOR Y=0 TO 479 STEP 80
1040 A(Y)=A(Y) OR 248 'MARK EVERY UNIT
1050 NEXT Y
1060 FOR Y=0 TO 479 STEP 40
1070 A(Y)=A(Y) OR 240 'MARK EVERY 1/2 U
NIT
1080 NEXT Y
1090 FOR Y=0 TO 479 STEP 8
1100 A(Y)=A(Y) OR 224 'MARK EVERY 1/10
1110 NEXT Y
1120 RETURN
2000 FOR Y=235 TO 245
2010 GOSUB 5000
2020 NEXT Y
2030 RETURN
3000 FOR Y=240 TO 244
3010 GOSUB 5000
3020 NEXT Y
3030 RETURN
4000 FOR Y=240 TO 242
4010 GOSUB 5000
4020 NEXT Y
4030 RETURN
5000 IF Y<0 OR Y>479 THEN RETURN 'OUT O
F RANGE
5010 A(Y)=A(Y) OR 2[(7-D) ' SET THE DOT
5020 RETURN

```

Program Listing 2 High-Resolution

```

100 DEFINT A-W 'THIS WILL HELP IT RUN
A LITTLE FASTER
110 DIM A(959) '960 BYTES MAKE ONE LINE
120 LPRINT CHR$(27)"@"; 'RESET MX-80 TO
DEFAULT SETTINGS
130 LPRINT CHR$(27)"A"CHR$(8); 'SET 8 D
OTS PER LINE SPACING
140 FOR L=0 TO 712 STEP 8 'ONCE FOR EA
CH LINE OF 8 DOTS
150 A(480)=170 'SET EVERY OTHER DOT ON
THE X-AXIS
160 FOR D=0 TO 7 'MAKE COMPUTATIONS FO
R EACH NEEDLE
170 X=(L+D)/100 'X BETWEEN 0.00 AND 7
.29, 100 DOTS/UNIT
180 IF X=0 THEN GOSUB 1000 'SET UP THE
Y-AXIS
190 IF X=INT(X) THEN GOSUB 2000 'TICK
MARK EACH UNIT
200 IF X*2=INT(X*2) THEN GOSUB 3000 'TI
CK MARK EACH 1/2 UNIT
210 IF (L+D)/10=INT((L+D)/10) THEN GOSU
B 4000 'MARK EACH 1/10
220 Y=SIN(X)
230 Y = INT(Y*160+480.5) 'COMPUTE BYTE
TO SET DOT IN

```

```

240 GOSUB 5000 'SET THE DOT
241 IF D>3 THEN Y=SIN(2*X) : Y=INT(Y*16
0+480.5) : GOSUB 5000
242 IF D<4 THEN Y=2*SIN(X) : Y=INT(Y*16
0+480.5) : GOSUB 5000
243 IF D=0 OR D=1 OR D=4 OR D=5 THEN Y=
COS(X) : Y=INT(Y*160+480.5) : GOSUB 500
0
244 IF D=2 OR D=3 OR D=6 OR D=7 THEN Y=
-SIN(X) : Y=INT(Y*160+480.5) : GOSUB 50
00
250 NEXT D
260 LPRINT CHR$(27)CHR$(76)CHR$(192)CHR
$(3); ' SET MX-80 FOR GRAPHICS IN THE 9
60 MODE FOR THE NEXT 960 BYTES
270 FOR I=0 TO 959
280 IF PEEK(14312)<>61 THEN 280 'PRINT
ER BUSY?
290 IF PEEK(293)=73 THEN OUT 248,A(I) '
MODEL III
300 IF PEEK(293)<>73 THEN POKE 14312,A(
I) 'MODEL I
310 A(I)=0 'RESET BYTE
320 NEXT I
330 LPRINT 'ADVANCE TO NEXT LINE
340 NEXT L
350 END
1000 FOR Y=0 TO 959
1010 GOSUB 5000
1020 NEXT Y
1030 FOR Y=0 TO 959 STEP 160
1040 A(Y)=A(Y) OR 248 'MARK EVERY UNIT
1050 NEXT Y
1060 FOR Y=0 TO 959 STEP 80
1070 A(Y)=A(Y) OR 240 'MARK EVERY 1/2 U
NIT
1080 NEXT Y
1090 FOR Y=0 TO 959 STEP 16
1100 A(Y)=A(Y) OR 224 'MARK EVERY 1/10
1110 NEXT Y
1120 RETURN
2000 FOR Y=470 TO 490
2010 GOSUB 5000
2020 NEXT Y
2030 RETURN
3000 FOR Y=480 TO 488
3010 GOSUB 5000
3020 NEXT Y
3030 RETURN
4000 FOR Y=480 TO 484
4010 GOSUB 5000
4020 NEXT Y
4030 RETURN
5000 IF Y<0 OR Y>959 THEN RETURN 'OUT O
F RANGE
5010 A(Y)=A(Y) OR 2[(7-D) ' SET THE DOT
5020 RETURN

```


HAPPINESS IS...NEWSCRIPT™

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

We offer you ongoing support by answering your questions and providing reasonably priced enhancements.

A FEW OF NEWSSCRIPT'S STANDARD FEATURES:

- *Form Letters with merging of names and addresses
- *Gives superb appearance to your final documents
- *Comprehensive manual with hundreds of examples
- *Centering, top/bottom titles, indents, pagination
- *Underlining, boldface, double-width, italics†
- *Sub-scripts, super-scripts, proportional pitch†
- *Generates Table of Contents, sorted Index
- *Allows block graphics, special symbols†
- *Search and replace globally or within a range
- *Block move, copy, delete, insert from other file
- *AUTOSAVE, WHOOPS, DIRECTORY, KILL, REPEAT
- *Based on IBM's "EDGAR" and "SCRIPT" systems
- *Supplied ready-to-run on "tiny" DOSPLUS
- *Easily transferred to NEWDOS, NEWDOS/80, LDOS, TRSDOS
- *Includes handy Quick Reference Card

NEWSSCRIPT CONTROLS THESE PRINTERS:

- *EPSON MX-80, MX-100: all 12 fonts, plus underlining and block graphics; italics with GRAFTRAX
- *Centronics 737, 739; Radio Shack L.P. IV, L.P. VIII, Prowriter, Daisy Wheel II, NEC PC-8023A, TEC 8500R, C.I.TOH 8510: Right-justified true proportional printing
- *Good support for: Diablo, Spinwriter, Starwriter, QUME, Microliner, Anadex, modified Selectric, standard line printers

NOW AVAILABLE: right-justified true proportional support for Diablo, Spinwriter, Starwriter, and Qume (DaisyWheel Option)**

TYPICAL USER AND REVIEWER COMMENTS:

"There is a new word processor on the market that will change the way people think about the capabilities of the TRS-80. Imagine a powerful mainframe text editor running on a TRS-80, with virtual compatibility between the two versions...on-going support second to none, with superb documentation." (Jim Klaproth, 80-U.S. JOURNAL February, 1982)

the manual:

"It definitely rates the first '10' given to any documentation reviewed in this column." (A.A. Wicks, COMPUTRONICS, October, 1981)

the software: "An excellent Word Processor" (D.H.); "Absolutely fantastic" (S.E.S.); "You have features that I cannot duplicate on my \$14,000 system" (J.B.)

the support: "Your phone information system and the prompt and courteous staff that you provide to help your clients...are worth the cost of the system." (V.H.H.)

REQUIRED CONFIGURATION: 48K TRS-80 with one-disk drive, Specify Model I or Model III.

† Some features work only if your printer has the mechanical capability

** DaisyWheel proportional is extra-cost option.

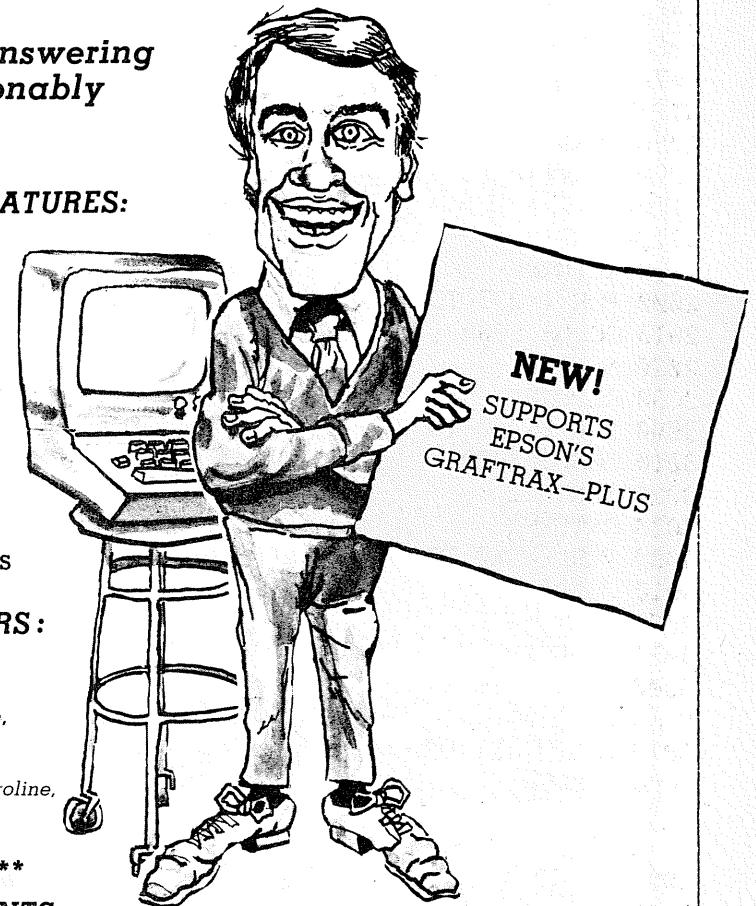
TO ORDER, CALL NOW, TOLL-FREE:

(800) 824-7888, Operator 422
CALIF: (800) 852-7777, Oper. 422
ALASKA/HAWAII: (800) 824-7919
FOR TECHNICAL INFORMATION CALL:
(213) 764-3131, or write to us.

Order from your Software dealer, or from:

PROSOFT™

DEPT. C, BOX 560 • NO. HOLLYWOOD, CA 91603



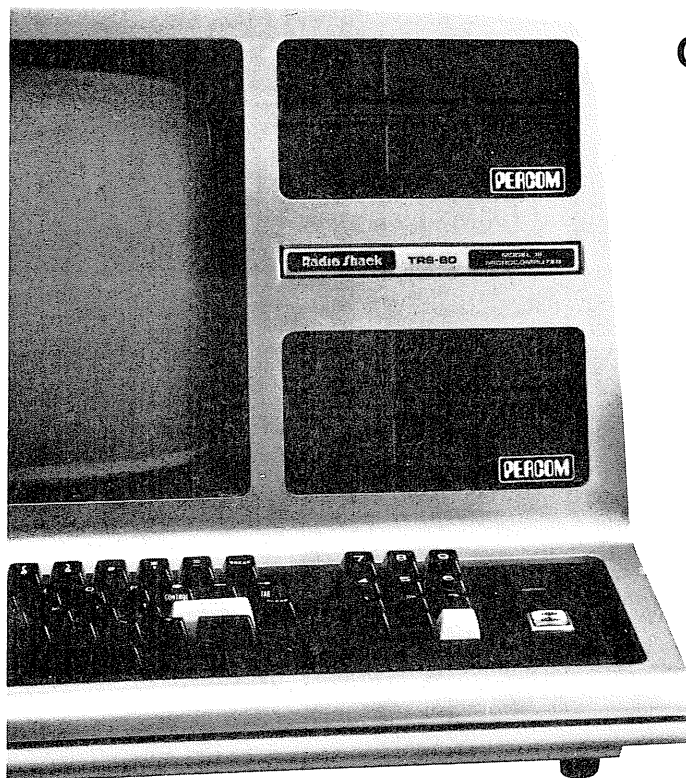
NEWSSCRIPT 7.0:	\$124.95
MAILING LABELS OPTION:	29.95
Special: NEWSSCRIPT + LABELS:	139.95
Daisywheel Proportional Option:	49.95
"PENCIL"/"SCRIPT" File Converter:	14.95
Manual Only (180 pages):	30.00
Reference Card Only:	2.50
Electric Webster + Correction Feature:	149.50
Graphics Editor and Programmer:	45.95
GEAP & Dotwriter (Hi-Res. letters):	74.95
DOSPLUS 3.4:	149.95

TERMS: We accept VISA, Mastercard, checks, Money Orders, C.O.D. and even cash. We pay shipping via surface UPS inside U.S.A. Please add \$3.00 for Blue Label, 6% tax in California, and 15% outside North America (air shipment).

TRS-80* Computer Owners...

GREATER VALUES

New Low Prices for Percom Model III Disk Drives!

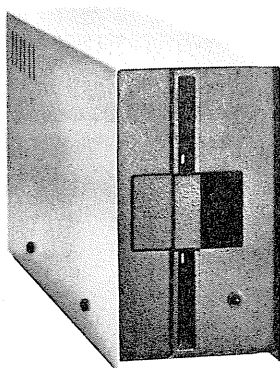


Complete First-Drive Systems from **\$449**

Internally mounted drives that feature double- or single-density storage, comprehensive pre-delivery testing, 48-hour burn-in and, best of all, Percom's widely acclaimed disk controller. A First-Drive System includes the four-drive disk controller, one or two drives, power supplies, cables and a fully illustrated owners manual. Use Model III TRSDOS*, Percom OS-80+ and all other Model III compatible DOSs.

Note: If you prefer not to make the First-Drive System installation, we'll do it for only \$29.95 plus shipping. This includes a 48-hour operating burn-in of your Model III computer, installation of the drive system and final checkout of the expanded system.

Our Own Fully Tested Drives from only **\$275**



- Every Access Floppy Disk drive is electrically tested, mechanically tested and burned-in 48 hours under operating conditions. Look for the signed test list in the shipping carton.
- AFD drives are capable of either single- or double-density operation. Store up to 364 Kbytes (formatted) in double density. Store twice the data on a single diskette using AFD "floppy" drives."
- 15-day free trial offer...comprehensive 90-day limited warranty...unbeatable prices...AFD-100 @ \$275.00, -100F @ \$329.00, -200 @ \$429.95, -200F @ \$449.95.

How to order - Order by calling Access Unlimited toll-free on 1-800-527-3475. Or order by mail. Orders may be charged to a VISA or Master Card account, or paid by cashier's check, certified check or money order. Sorry, we cannot accept personal checks. We pay freight (surface only) and insurance charges for shipments in U.S. on orders over \$1,000.00. Add approximate insurance and shipping charges for orders under \$1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum mail order \$20.00. Allow 2 to 4 weeks for delivery.

Texas (214) 340-5366

Save! VISA and Master Card charges are not deposited until the day your order is shipped.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

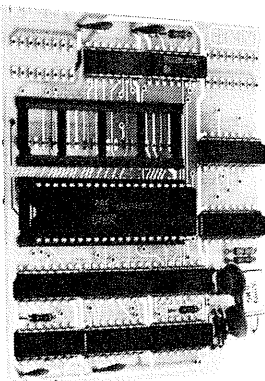
Everybody's Favorites - for Less!

Percom Data Separator	\$23.95
Green Screen I, II, or III	\$18.95
Head Cleaning Kit	\$24.95
Drive Numbering Tabs (pkg 0-3)	\$4.50
5 1/4" Flip-N-File	\$24.95
8" Flip-N-File	\$39.95

— LOWER PRICES

Percom's Proven DOUBLER II† Upgrade Your Model I to Double Density for only \$159.95

And not with some unproven hacker's kit, either. But with an assembled and fully tested *Percom DOUBLER-II†*. The DOUBLER II† simply plugs into the disk drive controller socket of your Expansion Interface. Then it lets you store over four times more on one side of a diskette, depending on the drive, than you can store on standard Tandy Model I drives. Other features: • Reads, writes and formats *either* single- or double-density • Includes DBLDOS™, a TRSDOS* compatible disk-operating system • Runs TRSDOS*, NEWDOS††, Percom OS-80† and other single-density software immediately. Change to double-density operation when convenient • Use Move 1-2-3 utility (\$29.95) or other appropriate software to read Model III programs on your Model I. • Includes on-card high-performance data separation and write precompensation circuitry.



Clear-Out Sale on Microline-80 Printers!

only **\$379**



Low Cost System Furniture

Modular design permits custom arrangements • Furniture styling and quality • TRS-80* colors • OK for UPS shipping • Reassemble without tools

System desks from \$115
Printer stands from \$144



Arrick Products Quick-Switch‡

Just flick a switch to connect your TRS-80* printer port from device #1 to device #2. Or, "Quick-Switch" a peripheral between computers. Versions for RS-232 or Centronics interfacing. Includes box-mounted 34-pin card-edge plugs. From \$89.95. Cables from \$29.95.

‡ trademark of Arrick Products Company.

Save! Make ACCESS your one-call shopping center for TRS-80* hardware and software. Call our toll-free order number for free product literature and latest prices. **Ask for our new, free software catalog.**

**Toll-Free
Order No.**

1-800-527-3475 ◇

(orders & literature only)

ACCESS UNLIMITED

**401 N. Central Expressway #600
Richardson, Texas 75080
(214) 340-5366**

*Trademark of Access Unlimited

†Trademark of Percom Data Company, Inc.

*Trademark of Tandy Radio Shack Corporation.

††Trademark of Apparat Corporation.



Drafting on the TRS-80

Routines to draw arcs, circles and lines

Model I/III, 16K

Darrel L. Bartelheimer, Snohomish, WA

I have become fascinated with CAD/CAM (Computer Aided Drafting/ Computed Aided Manufacturing) in industry. Never have I seen anything resembling this for the home computer. Therefore, I decided to write my own version of a computer drafting machine.

The TRS-80 has limited resolution graphics, with 47 points vertical and 127 points horizontal. A more serious problem is that the dots are not dots but rectangles with the vertical dimension about twice the horizontal dimension. This severely distorts circles and causes lines to be of different widths depending on whether they are vertical or horizontal.

Remembering from elementary drafting that almost any complex figure can be drawn using just a compass and straightedge, that is, using straight lines and arcs (of circles) or circles. This program defines the CRT (video screen) as being an 8-inch high by 10-inch wide drafting board. Coordinates are defined such that the point (0,0) is at the lower left hand corner of the screen. All coordinates are in inches. It draws arcs in a subroutine at location 1000 given the center location X and Y, the radius R, and the starting and ending angles TL and TU, respectively. The angles are defined as in a compass rose with zero degrees straight up (North), 90 degrees right (East), 180 down (South) and 270 left (West). Negative angles may be entered, but one must be certain that the starting angle is less than the ending angle. An option is the display of the center point of the circle. Set CC to 1 to display the center, 0 otherwise.

No attempt is made here to explain the operation of the line and arc subroutines since these involve trigonometry and analytic geometry. Towards the end

of writing these routines, I sometimes did whatever it took to get them to work as specified instead of analyzing each step, so there are probably changes that can be made to make them 'more elegant.' For now, they work. Just use them. Treat them as software black boxes.

Lines 800 and 805 are approximately an hour timer to prevent the computer from writing over your display.

To draw your own displays, erase all lines from 50 to 799, and replace them with your own display commands.

A Guided Tour

I feel that the best method of teaching this system is to give a guided tour through the generation of the Test Pattern. Refer to the listing and the Test Pattern, Figure 1 for the following discussion.

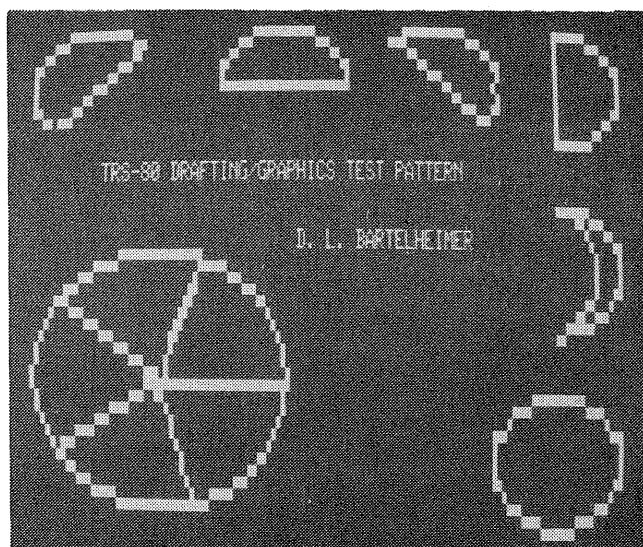
The semicircle in the upper right hand corner is generated from line 50. Its center position on the 8x10-inch page is X=8.9, Y=7.25 with a radius, R=1. Only the right hand side of the circle is displayed, corresponding to a starting angle, TL, of 0 (TL=0) and the ending angle, TU, of 180 (TU=180). We do not want the center displayed, so CC is set to 0 (CC=0). Actually, since we draw the diameter, this point is eventually displayed. The semicircle is drawn by calling the subroutine at location 1000 (GOSUB 1000) to draw the arc.

The vertical line of this figure is drawn from line 55. Starting at the top, X=8.9 (the same as the center of the circle), Y, however, is 7.25 plus a distance equal to the radius (=1) or Y=8.25. The distance is 2 (D=2), twice the radius. The angle is 180 (T=180), straight down. The line is drawn by the subroutine at location 2000

(GOSUB 2000).

Examining the figure immediately to the left, we notice that the figure is rotated 45 degrees ($\frac{1}{8}$ turn) counterclockwise. The semicircle is drawn from statement 60. X, Y and R should be self-explanatory at this point. The angles are TL=45 and TU=135. This is simply 45 subtracted from the angles of line 50. TL=315 and TU=495 would work just as well. Note, however, that TL=45 and TU=495 would draw the entire circle.

Figure 2



The diameter is drawn from line 65 at T=135 degrees. The location of the starting point was determined by trial and error, i.e., by picking an approximate point and then drawing the line (running the program). If the line is not where you wish it to be, use the Editor to change the coordinates. (Guess again.)

Another method of drawing this line is demonstrated in lines 85 and 87. These lines refer to the figure in the upper left hand corner. Here we use the center of the semicircle as the starting point and draw lines of length equal to the radius in the directions 45 and -135 degrees. (D=1 and T=45, -135 respectively.)

The next figure of interest is the quarter moon figure in the second row, far right. The outer semicircle is simply a half circle drawn from line 130. The inner circle is a partial circle of larger radius. Another subroutine at location 3000 was written to handle problems where the radius and angles are unknown but the starting and ending coordinates are known. Referring to line 135, the center point has the same Y coordinate (Y=4.25) but the X coordinate has been moved $\frac{1}{2}$ inch to the left (X=8.4). The starting and ending coordinates of the arc can be determined from line 130. The X coordinate of both are the same as the previous center. The Y coordinates are one inch (the previous radius) above and below the present Y center coordinate (Y=5.25 and 3.25 resp.). New variables are defined to handle these starting and ending coordinates. These are XL and YL for the start of the arc and XU and YU for the end. After these

variables are set, the subroutine at line 3000 is called.

The circle at the lower right hand corner is drawn from line 250. Here the starting and ending angles, TL and TU, are 0 and 360 degrees.

The large wheel with five spokes is drawn using the subroutine at line 4000. It is called from line 700. X, Y and R are set for the outer circle. The number of spokes is specified by setting NS (NS=5). TS is the angle where the first spoke is located. Note that the program evenly spaces the spokes angle-wise.

Drafting on Other Computers

For readers who may wish to rewrite these routines to run on non-TRS-80 computers, some comments are in order. Obviously, of course, any changes between the BASIC of the TRS-80 and other machines will have to be taken into account. This section is mainly concerned with scaling and display dimensions.

Lines 1000 and 2000 introduce the coordinate transformation for X and Y. The TRS-80 plots 12.7 points/inch on the X-axis and 5.371 points on the Y-axis. Since there are 47 points on the Y-axis and I wished to define (0,0) in the bottom left corner, I had to invert the display by the statement:

YS=47-5.371*Y

The statement: SF=2.36455 in lines 1000 and 3000 is merely the ratio of 12.7/5.371 needed for display angle calculations. Other constants in the listings are merely conversions from degrees to radians and vice-versa since the TRS-80 uses radians and I chose degrees in these routines for ease of use.

Ed. Note M/The demonstration program (Listing 2) will produce the drawing seen in the heading of this article.

Listing 1 Test Pattern

```
10 CLS
50 X=8.9: Y=7.25: R=1: TL=0 : TU=180 :
CC=0 : GOSUB 1000
55 X=8.9: Y=8.25: D=2 : T=180 : GOSUB 2
000
60 X=6.9 : Y=7.25 : R=1 : TL=-45 : TU=1
35 : CC=0 : GOSUB 1000
65 X=6.4 : Y=8 : D=2 : T=135 : GOSUB 20
00
70 X=4.5 : Y=7.25 : R=1 : TL=-90 : TU=9
0 : CC=0 : GOSUB 1000
75 X=3.5 : Y=7.25 : D=2 : T=90 : GOSUB
2000
80 X=1.5 : Y=7.25 : R=1 : TL=-135 : TU=
45 : CC=0 : GOSUB 1000
85 X=1.5 : Y=7.25 : D=1 : T=45 : GOSUB
2000
87 X=1.5 : Y=7.25 : D=1 : T=-135 : GOSU
B 2000
```



```

130 X=8.9: Y=4.25: R=1 : TL=0 : TU=180
: CC=0 : GOSUB 1000
135 X=8.4: Y=4.25: XL=8.9: YL=5.25: XU=8
.9: YU=3.25: GOSUB 3000
250 X=8.9: Y=1.25: R=1 : TL=0: TU=360: CC=0
: GOSUB 1000
300 PRINT@ 330, "TRS-80 DRAFTING/GRAPHI
CS TEST PATTERN";
320 PRINT@ 478, "D. L. BARTELHEIMER";
700 X=2.5 : Y=2.5 : R=2 : TS=20 : NS=5
: GOSUB 4000
800 FOR I=0 TO 1000000
805 NEXT I
990 REM *****
991 REM
992 REM ** THIS SUBROUTINE DRAWS ARCS O
R CIRCLES,
993 REM ** WITH CENTER AT X, Y
994 REM ** RADIUS OF R
995 REM ** STARTING ANGLE TL
996 REM ** ENDING ANGLE TU
997 REM ** FLAG CC=1, CENTER POINT D
RAWN, CC=0 OTHERWISE
998 REM

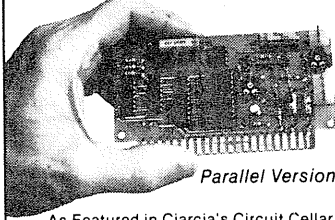
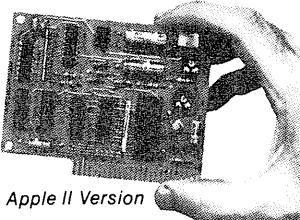
```

```

999 REM *****
1000 XS=12.7*X : YS=47-5.371*Y : RX=12.
8*R : RY=5.371*R : SF=2.36455 : IF TL>T
U THEN TU=TU+360
1005 IF TL<0 THEN TL=TL+360 : TU=TU+360
1010 IF CC=1 THEN SET(XS+0.5,YS+0.5)
1015 IF (TL <= 90 AND TU >= 90) OR TU >
=450 THEN 1020 ELSE 1025
1020 SET(XS+RX+0.5,YS+0.5)
1025 IF (TL <= 270 AND TU >= 270) OR TU
>=630 THEN 1030 ELSE 1035
1030 SET(XS-RX+0.5,YS+0.5)
1035 IF (TL <= 180 AND TU >= 180) OR TU
>= 540 THEN 1040 ELSE 1045
1040 SET(XS+0.5,YS+RY+0.5)
1045 IF (TL <= 0 AND TU >= 0) OR TU >=3
60 THEN 1050 ELSE 1055
1050 SET(XS+0.5,YS-RY+0.5)
1055 FL=0 : F1=0 : YL=RY
1100 FOR XX=1 TO RX
1110 YY=RY*RY - 0.1761*XX*XX
1112 IF YY<0 THEN YY=0
1114 YY=SQR(YY)
1116 IF YL-YY>1 THEN YT=YY : YY=YL-1 :
FL=1 : ELSE FL=0
1118 TH=90-57.29578*ATN(SF*YY/XX) : T2=
TH : IF (TL <= T2 AND TU >= T2) OR TU >
= 360+T2 THEN 1120 ELSE 1125
1120 SET(XS+XX+0.5,YS-YY+0.5)
1125 T3=360-TH : IF (TL <= T3 AND TU >=
T3) OR TU >= 360+T3 THEN 1130 ELSE 113
5
1130 SET(XS-XX+0.5,YS-YY+0.5)
1135 T2=180-TH : IF (TL <= T2 AND TU >=
T2) OR TU >= 360+T2 THEN 1140 ELSE 114
5
1140 SET(XS+XX+0.5,YS+YY+0.5)
1145 T4=180+TH : IF (TL<= T4 AND TU>=T
4) OR TU>=360+T4 THEN 1150 ELSE 1160
1150 SET(XS-XX+0.5,YS+YY+0.5)
1160 IF F1=1 THEN GOTO 1600
1175 IF FL=1 THEN YY=YY-1 ELSE GOTO 120
0
1180 IF YY<=YT-1 THEN 1200 ELSE GOTO 11
18
1200 YL=YY
1500 NEXT XX
1550 IF F1=0 AND YY>0 THEN F1=1 : GOTO
1118
1600 IF YY>0 THEN YY=YY-1 : F1=1
1610 IF YY>0 THEN GOTO 1118
1620 RETURN
1990 REM *****
1991 REM
1992 REM ** THIS ROUTINE DRAWS A STRAI
GHT LINE,

```

SWEET-TALKER, IT GIVES YOUR COMPUTER AN UNLIMITED VOCABULARY.





As Featured in *Ciarcia's Circuit Cellar*,
Byte Magazine, September 1981.


The Sweet-Talker voice synthesizer allows you to add speech of unlimited vocabulary to your computer. Utilizing the Votrax SC-01A chip, you can output any message by programming individual phonemes. Comes in two versions; one plugs directly into your Apple II, the other connects to any computer with an 8-bit parallel printer port. + 12 volts and + 5 volts required for parallel board.

• Contains 64 different phonemes accessed by a 6-bit code.	ST01	Sweet Talker Parallel Port Board A & T.....	\$139.00
• Automatic and manual inflection modes.	ST02	Sweet Talker Apple II plug in board.....	149.00
• Parallel port driven or plug-in compatible with Apple II.	ST06	Text-to-Speech algorithm on disk for Apple II.....	35.00
• Super text-to-speech algorithm on disk for Apple II. Makes Sweet-Talker equivalent to units 3 times the cost.	SC01A	Votrax Speech Synthesizer chip.....	70.00
• On board audio amplifier		5 or more.....	55.00 each
• Sample program on cassette with Apple II board.	UPS01	Universal Power Supply-A & T.....	35.00
• Optional power supply for parallel board.		Add \$2.00 for shipping & handling.	

To Order: Call Toll Free 1-800-645-3479
(In N.Y. State Call: 1-516-374-6793)
For Information Call: 1-516-374-6793



MICROMINT INC.
917 Midway
Woodmere N.Y. 11598



PRICE BREAKTHROUGH

September, 1982 **25**


```

1993 REM **      STARTING AT X, Y
1994 REM **      OF LENGTH (DISTANCE) D
1995 REM **      AND ANGLE (IN DEGREES) O
F T (THETA)
1996 REM
1997 REM *****
2000 XS=12.7*X : YS=47-5.371*Y : T=0.01
745329*T
2010 DX=12.7*SIN(T)*D : DY=5.371*COS(T)
*D
2012 SS=0
2014 IF (-.349<T AND .349>T) OR T>5.934
OR (2.51327<T AND 3.77>T) THEN 2100 E
LSE 2015
2015 K=DY/DX : IF K=0 THEN ST=1 ELSE ST
=1/K
2017 IF ABS(ST)>1 THEN SS=1 ELSE SS=ABS
(ST)
2018 IF DX<0 THEN SS=-SS
2020 SET(XS+0.5,YS+0.5)
2040 FOR I=XS+1 TO XS+DX STEP SS
2050 J=YS-K*(I-XS)
2060 SET(I+0.5,J+0.5)
2062 NEXT I
2064 RETURN
2100 K=DX/DY : IF K=0 THEN ST=1 ELSE ST
=1/K
2110 IF ABS(ST)>1 THEN SS=1 ELSE SS=ABS
(ST)
2120 IF DY>0 THEN SS=-SS
2130 SET(XS+0.5,YS+0.5)
2140 FOR I=YS+1 TO YS-DY STEP SS
2150 J=XS-K*(I-YS)
2160 SET(J+0.5,I+0.5)
2170 NEXT I
2180 RETURN
2990 REM *****
2991 REM
2992 REM **      THIS ROUTINE DRAWS ARCS W
HERE
2993 REM **      X,Y ARE COORDINATES OF
CENTER
2994 REM **      XL,YL ARE COORDINATES O
F START OF ARC
2995 REM **      XU,YU DEFINE THE ANGULA
R LENGTH OF THE ARC
2996 REM **      THE ANGLES DO NOT HAV
E TO BE GIVEN FOR THIS
2997 REM **      ENTRY POINT. THE CENT
ER IS NOT DRAWN
2998 REM
2999 REM *****
3000 CC=0 : R=SQR((XL-X)[2 +(YL-Y)[2] :
SF=2.36455 : IF YL-Y=0 THEN TL=90 ELSE
TL=57.29578*ATN(SF*(XL-X)/(YL-Y))
3010 IF XL-X <0 THEN TL=TL-180

```

```

3020 IF YU-Y=0 THEN TU=0 ELSE TU=57.295
78*ATN(SF*(XU-X)/(YU-Y))
3030 IF XU-X <0 THEN TU=TU+180
3035 TL=90-TL : TU=90-TU
3040 GOTO 1000
3990 REM *****
3991 REM
3992 REM **      THIS SUBROUTINE DRAWS A WH
EEL WITH SPOKES
3993 REM **      X, Y ARE COORDINATES OF
CENTER
3994 REM **      R IS RADIUS
3995 REM **      NS IS NUMBER OF SPOKES
3996 REM **      TS IS ANGLE OF ONE OF TH
E SPOKES
3997 REM
3998 REM *****
4000 TL=0 : TU=360 : CC=1 : GOSUB 1000
4050 D=R : T=TS : GOSUB 2000
4100 TT=360/NS
4150 FOR II=1 TO NS
4200 TS=TS+TT : T=TS : GOSUB 2000
4250 NEXT II
4300 RETURN

```

Listing 2 Demonstration Program

```

10 CLS
50 X=1 : Y=2.3 : D=6 : T=90 : GOSUB 200
0
55 X=1 : Y=2.3 : D=3.5 : T=0 : GOSUB 20
00
60 X=1.5 : Y=5.8 : R=0.5 : TL=-90 : TU=
90 : CC=0 : GOSUB 1000
65 X=6 : Y=2.3 : R=1 : TL=0 : TU=90 : G
OSUB 1000
70 X=2 : Y=4.8 : D=1 : T=0 : GOSUB 2000
75 X=3.5 : Y=4.8 : R=1.5 : TL=180 : TU=
270 : GOSUB 1000
80 X=3.5 : Y=3.3 : D=2.8 : T=90 : GOSUB
2000
85 X=7 : Y=2.3 : D=2 : T=45 : GOSUB 200
0
90 X=7.414 : Y=3.714 : R=1 : TL=0 : TU=
90 : GOSUB 1000
95 X=3.1414 : Y=6.214 : D=1 : T=0 : GOS
UB 2000
100 X=4.6414 : Y=6.214 : R=1.5 : TL=180
: TU=270 : GOSUB 1000
105 X=4.6414 : Y=4.714 : D=2.8 : T=90 :
GOSUB 2000
110 X=2.6414 : Y=7.214 : R=0.5 : TL=-70
: TU=90 : GOSUB 1000
115 X=1 : Y=6.1 : D=2 : T=45 : GOSUB 20
00

```



```

120 X=6 : Y=2.3 : D=1 : T=180 : GOSUB 2
000
125 X=6.5 : Y=2.3 : D=1 : T=180 : GOSUB
2000
130 X=6 : Y=1.3 : D=0.5 : T=90 : GOSUB
2000
135 X=6.25 : Y=1.1 : R=1.1 : TS=50 : NS
=9 : GOSUB 4000
140 X=2.314 : Y=3.9 : D=3.5 : T=0 : GOS
UB 2000
145 X=2.414 : Y=3.714 : D=6 : T=90 : GO
SUB 2000
155 X=6.5 : Y=1.3 : D=2 : T=45 : GOSUB
2000
160 X=7.914 : Y=2.714 : D=0.7 : T=0 : G
OSUB 2000
165 X=7.664 : Y=2.714 : R=1.1 : TL=30 :
TU=220 : GOSUB 1000
180 X=8.698 : Y=2.3378 : D=0.85 : T=290
: GOSUB 2000
190 X=8.698 : Y=3.09 : D=0.85 : T=250 :
GOSUB 2000
193 X=8.214 : Y=1.7614 : D=0.85 : T=330
: GOSUB 2000
196 X=7.473 : Y=1.8 : D=0.75 : T=10 : G
OSUB 2000
200 X=3.514 : Y=3.514 : R=2 : TL=-5 : T
U=55 : CC=0 : GOSUB 1000
210 X=3.514 : Y=3.514 : R=2 : TL=130 :
TU=230 : CC=0 : GOSUB 1000
230 X=4.122 : Y=5.419 : D=0.5 : T=198 :
GOSUB 2000
240 X=4.919 : Y=4.919 : D=0.5 : T=225 :
GOSUB 2000
250 X=3.38 : Y=1.7 : D=0.5 : T=3.85 : G
OSUB 2000
260 X=4.323 : Y=1.885 : D=0.5 : T=336 :
GOSUB 2000
270 X=2.468 : Y=1.81 : D=0.5 : T=31.5 :
GOSUB 2000
500 PRINT@ 10, "TRS-80 DRAFTING/GRAPHIC
S DEMONSTRATION PROGRAM";
550 PRINT@ 98, "DARREL L. BARTELHEIMER"
;
700 X=2.1 : Y=2.1 : R=2 : TS=20 : NS=13
: GOSUB 4000
800 FOR I=0 TO 1000000
805 NEXT I
990 REM *****
991 REM
992 REM ** THIS SUBROUTINE DRAWS ARCS O
R CIRCLES,
993 REM ** WITH CENTER AT X, Y
994 REM ** RADIUS OF R
995 REM ** STARTING ANGLE TL
996 REM ** ENDING ANGLE TU

```

```

997 REM ** FLAG CC=1, CENTER POINT D
RAWN, CC=0 OTHERWISE
998 REM
999 REM *****
1000 XS=12.7*X : YS=47-5.371*Y : RX=12.
8*R : RY=5.371*R : SF=2.36455 : IF TL>T
U THEN TU=TU+360
1005 IF TL<0 THEN TL=TL+360 : TU=TU+360
1010 IF CC=1 THEN SET(XS+0.5,YS+0.5)
1015 IF (TL <= 90 AND TU >= 90) OR TU >
=450 THEN 1020 ELSE 1025
1020 SET(XS+RX+0.5,YS+0.5)
1025 IF (TL <= 270 AND TU >= 270) OR TU
>=630 THEN 1030 ELSE 1035
1030 SET(XS-RX+0.5,YS+0.5)
1035 IF (TL <= 180 AND TU >= 180) OR TU
>= 540 THEN 1040 ELSE 1045
1040 SET(XS+0.5,YS+RY+0.5)
1045 IF (TL <= 0 AND TU >= 0) OR TU >=3
60 THEN 1050 ELSE 1055
1050 SET(XS+0.5,YS-RY+0.5)
1055 FL=0 : F1=0 : YL=RY
1100 FOR XX=1 TO RX
1110 YY=RY*RY - 0.1761*XX*XX
1112 IF YY<0 THEN YY=0

```

PROPERTY MANAGEMENT SYSTEM PMS-1

- Saves hours of Bookkeeping
- Increases accuracy
- 100% User Support
- 100% Satisfaction Guarantee
- Income Statement
- Vacancy Report
- Expense Ledger
- Tenant History
- Auto Late Charge
- Bar Charts & Graphs
- Up to 800 Units
- Simple to Use

For TRS-80 Model I & III 32K 1 Disk minimum.
Only \$169.95 on Diskette, Complete with User's Manual.

LOAN AMORTIZATION PROGRAM

Print or display an Amortization Schedule for a given mortgage contract. Perfect for Real Estate investors.

For TRS-80 Model I, III, and Color Ext. Basic 16K
Only \$13.95 on Tape and \$15.95 on Diskette.

ARCADE & ADVENTURE GAMES

- | | |
|-----------------------|-------------------|
| Air War | Nuclear Holocaust |
| B-52 Strategic Bomber | Raid on Entebbe |
| Car Wars | Space Colony |
| F-15 Death Pilot | Street Fight |
| Killer Satellite | Submarine Attack |

For TRS-80 Model I, III, and Color Ext. Basic 16K
Games only \$11.95 on Tape and \$13.95 on Diskette.

13

C.O.D. orders add \$2.50

COMTRONIC SYSTEMS

4028 Somerset Lane, Kent WA 98032


```

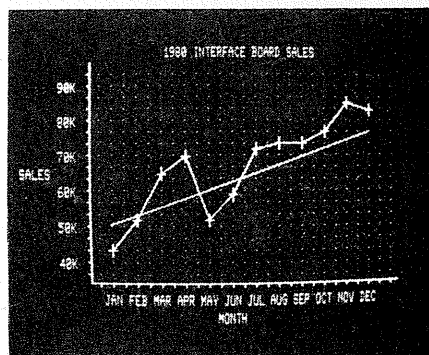
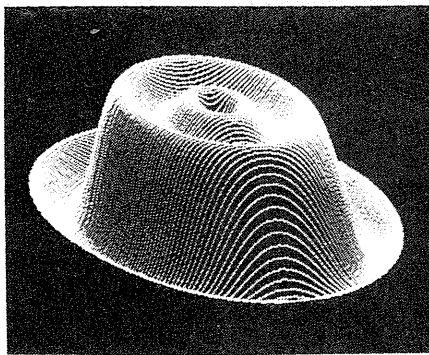
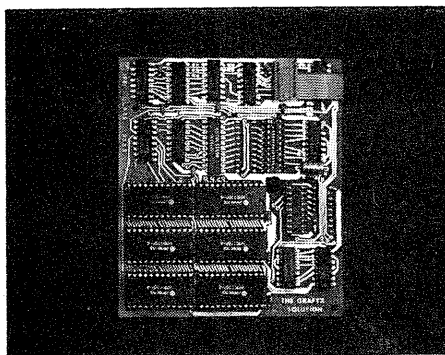
1114 YY=SQR(YY)
1116 IF YL-YY>1 THEN YT=YY : YY=YL-1 :
FL=1 : ELSE FL=0
1118 TH=90-57.29578*ATN(SF*YY/XX) : T2=
TH : IF (TL <= T2 AND TU >= T2) OR TU >
= 360+T2 THEN 1120 ELSE 1125
1120 SET(XS+XX+0.5,YS-YY+0.5)
1125 T3=360-TH : IF (TL <= T3 AND TU >=
T3) OR TU >= 360+T3 THEN 1130 ELSE 113
5
1130 SET(XS-XX+0.5,YS-YY+0.5)
1135 T2=180-TH : IF (TL <= T2 AND TU >=
T2) OR TU >= 360+T2 THEN 1140 ELSE 114
5
1140 SET(XS+XX+0.5,YS+YY+0.5)
1145 T4=180+TH : IF (TL<= T4 AND TU>=T
4) OR TU>=360+T4 THEN 1150 ELSE 1160
1150 SET(XS-XX+0.5,YS+YY+0.5)
1160 IF FL=1 THEN GOTO 1600
1175 IF FL=1 THEN YY=YY-1 ELSE GOTO 120
0
1180 IF YY<=YT-1 THEN 1200 ELSE GOTO 11
18
1200 YL=YY
1500 NEXT XX
1550 IF FL=0 AND YY>0 THEN FL=1 : GOTO
1118
1600 IF YY>0 THEN YY=YY-1 : FL=1
1610 IF YY>0 THEN GOTO 1118
1620 RETURN
1990 REM *****
1991 REM
1992 REM ** THIS ROUTINE DRAWS A STRAI
GHT LINE,
1993 REM ** STARTING AT X, Y
1994 REM ** OF LENGTH (DISTANCE) D
1995 REM ** AND ANGLE (IN DEGREES) O
F T (THETA)
1996 REM
1997 REM *****
2000 XS=12.7*X : YS=47-5.371*Y : T=0.01
745329*T
2010 DX=12.7*SIN(T)*D : DY=5.371*COS(T)
*D
2012 SS=0
2014 IF (-.349<T AND .349>T) OR T>5.934
OR (2.51327<T AND 3.77>T) THEN 2100 E
LSE 2015
2015 K=DY/DX : IF K=0 THEN ST=1 ELSE ST
=1/K
2017 IF ABS(ST)>1 THEN SS=1 ELSE SS=ABS
(ST)
2018 IF DX<0 THEN SS=-SS
2020 SET(XS+0.5,YS+0.5)
2040 FOR I=XS+1 TO XS+DX STEP SS
2050 J=YS-K*(I-XS)
2060 SET(I+0.5,J+0.5)

```

```

2062 NEXT I
2064 RETURN
2100 K=DX/DY : IF K=0 THEN ST=1 ELSE ST
=1/K
2110 IF ABS(ST)>1 THEN SS=1 ELSE SS=ABS
(ST)
2120 IF DY>0 THEN SS=-SS
2130 SET(XS+0.5,YS+0.5)
2140 FOR I=YS+1 TO YS-DY STEP SS
2150 J=XS-K*(I-YS)
2160 SET(J+0.5,I+0.5)
2170 NEXT I
2180 RETURN
2990 REM *****
2991 REM
2992 REM ** THIS ROUTINE DRAWS ARCS W
HERE
2993 REM ** X,Y ARE COORDINATES OF
CENTER
2994 REM ** XL,YL ARE COORDINATES O
F START OF ARC
2995 REM ** XU,YU DEFINE THE ANGULA
R LENGTH OF THE ARC
2996 REM ** THE ANGLES DO NOT HAV
E TO BE GIVEN FOR THIS
2997 REM ** ENTRY POINT. THE CENT
ER IS NOT DRAWN
2998 REM
2999 REM *****
3000 CC=0 : R=SQR((XL-X)[2 +(YL-Y)[2] :
SF=2.36455 : IF YL-Y=0 THEN TL=90 ELSE
TL=57.29578*ATN(SF*(XL-X)/(YL-Y))
3010 IF XL-X <0 THEN TL=TL-180
3020 IF YU-Y=0 THEN TU=0 ELSE TU=57.295
78*ATN(SF*(XU-X)/(YU-Y))
3030 IF XU-X <0 THEN TU=TU+180
3035 TL=90-TL : TU=90-TU
3040 GOTO 1000
3990 REM *****
3991 REM
3992 REM ** THIS SUBROUTINE DRAWS A WH
EEL WITH SPOKES
3993 REM ** X, Y ARE COORDINATES OF
CENTER
3994 REM ** R IS RADIUS
3995 REM ** NS IS NUMBER OF SPOKES
3996 REM ** TS IS ANGLE OF ONE OF TH
E SPOKES
3997 REM
3998 REM *****
4000 TL=0 : TU=360 : CC=1 : GOSUB 1000
4050 D=R : T=TS : GOSUB 2000
4100 TT=360/NS
4150 FOR II=1 TO NS-1
4200 TS=TS+TT : T=TS : GOSUB 2000
4250 NEXT II
4300 RETURN

```

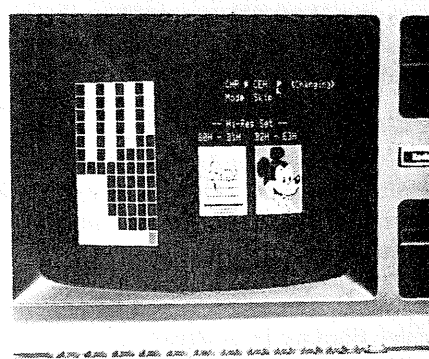
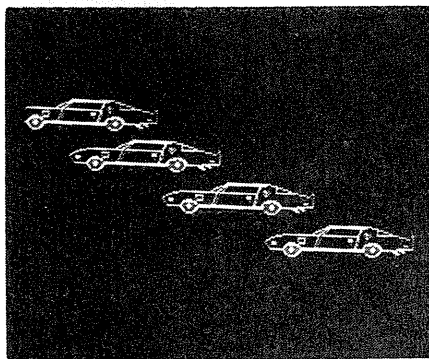
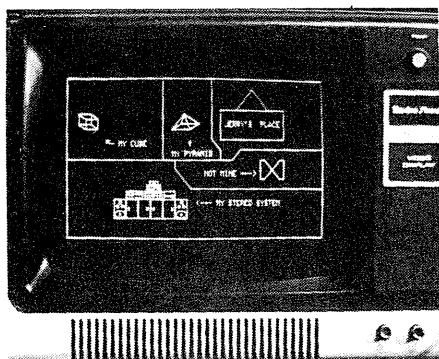



Mod III

GRAFYX SOLUTIONTM

\$299.95 # 14

- 512 × 192 Dot Graphics increases resolution 16X (better than Apple)
- Extensive Business, Personal, Educational, and Scientific applications
- 14 BASIC commands set and reset Points, Lines, Circles, Boxes, etc.
- Allows Display and Printout of detailed Line, Bar, and Pie graphs
- 80 Character/line display compatible with BASIC programs and DOS
- Price includes 98K bits memory, 30 programs, 52 page manual
- Plug-in, clip-on board eliminates soldering for easy installation



Mod I, III

80-GRAFIXTM

\$169.95 # 15

- Create and Save 128 programmable hi-resolution characters/shapes
- Characters are generated within an 8 × 12 matrix (Mod I: 6 × 12)
- Great for creating game figures, symbols, and alternate character sets
- Excellent software support (20 programs) & extensive documentation
- Module easily installs within the computer with no soldering

Manual only \$15
Products guaranteed
Dealers welcome

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

FREE shipping
Prepaid or COD
Tx. res add 5%

Two graphs for Model II/16

Histograms and regression lines for your printer or video

Model II/16

Mike Schmidt, Publisher

Very little, in the way of graphics, has been seen for the Model II since it was released in late 1979. The absence of PEEK and POKE in the Model II BASIC has, no doubt, been responsible for at least some of the dearth of graphics for that machine.

Since no one seems to be doing graphics, we decided to do it ourselves. Two programs are presented here. The first, PLOT1, prints up to twenty items in a bar chart. It uses the Model II graphics in its display on the video screen. An option to lineprint on an 80-column or more printer is included. The line printer display is decidedly different from that on the screen however. The command used in the Model II to cause the screen to print to the printer is SYSTEM "SCREEN." This command reads video memory and faithfully (up to a point) sends it to the lineprinter. In the TRSDOS system, all graphics characters are changed to periods when using SYSTEM "SCREEN."

It still makes for a reasonably nice display, but the video display is preferable.

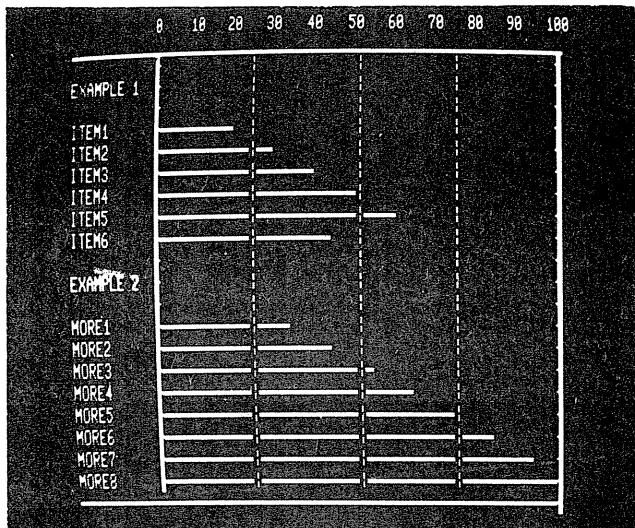
The program PLOT1 (Listing 1), is largely self-evident. Remark statements precede most modules. The scale is set by the user prior to entering data. It should be just slightly larger than the largest value to be entered. Although it is possible to use any number for the scale, it may be preferable to stick to decades, i.e., 10, 100, 1000, to prevent cluttering the scale annotation above the graph.

It is possible to name the plot by using the first item in this manner: ITEM,0. Vertical spaces between items may also be left by entering a value of (space),0. To terminate entering items, enter 0,0. The input of items will terminate itself if the items exceed twenty. There is error trapping for item names over nine characters long and for values which exceed the user-entered scale value. Values less than zero are not used in this histogram, since they would not print.

This program also works on a Model 16 operating under TRSDOS-II mode. In fact, it was created on a Model 16 and FCOPY was used to transfer it back to straight Model II. This is also true for the second

program, Listing 2, which follows.

Listing 2 shows a different plot program for Model II/16. This program is designed to print only on a line printer. It requires a 132-character lineprinter, or printers like the Microline 80 or MX-80, which can be set to 132-character modes.

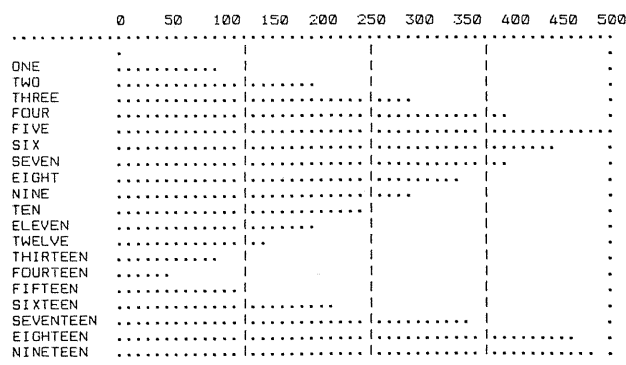


Screen photo of PLOT1.

In Listing 2, PLOT2, the data is entered at the end of the program as DATA statements. One of the features of this program is that it automatically saves itself after each run. This is so that newly entered (or added to) data statements will be saved.

Two additional features of this program are that the actual value of the data is printed (not scaled) to the right of the bar in the graph and the graph is followed by a three-period projection, also with values printed at the right. The values for the regression line are printed after the graph is completed. The scale factor for this program is not entered by the user, but is determined automatically by the program. The method used is to search the data statements for the largest value and

Figure 1
Sample printer output from PLOT1.



then set the scale factor accordingly. Because of this, it is not a very presentable graph when widely varying values are used. For example, using all values in tens and then putting one value at 10000 would cause poor definition of all the lower values.

Some program notes on Listing 2 are in order. Line 80 clears about one-third of available memory.

You can name your graph by entering that name in line 300.

You can choose your own label in line 320.

Starting at line 350, the program searches through the data items to find the highest number. It then sets variable D1 for the scale factor.

Lines 360 and 420 allow for 1000 data items. This should be more than enough, but if you need more these two should be changed. The maximum number of data items is the limit of your memory.

The variable L in line 470 represents the length of the bar for the chart. The letter X is used to make the bar.

Figure 2
Sample run and output from PLOT2 program.

MODEL 11/16 GRAPH PLOTTER WITH THREE PERIOD PROJECTION
FOR USE WITH 132 CHARACTER LINEPRINTER

The data for this program must be entered as DATA lines at the end of the program. The form of these DATA statements is:

DATA LABEL,####

where LABEL is a name and ### is a numeric value.

The very last DATA statement should contain a dummy label and a numeric value of -1, like this: DATA , -1

The program will automatically save itself after it is run to save DATA statements that has been entered or added to.

Line up your printer paper and ENTER to continue
?

GRAPH NAME

[illegible]

THE X & Y FOR THE REGRESSION LINE ARE:

$$Y = 3356,34 + 405,334 X$$

A Sweet Deal...

Buy an Alpha Joystick and games together and deduct up to \$14.00 from your order.



The Alpha Joystick adds arcade-style control to TRS-80 action games. Simply plug it in and begin playing joystick compatible games. No modification, wiring or batteries are required, and the Alpha Joystick is compatible with other TRS-80 accessories. The instructions are clear and complete. We even show how easy it is to experiment in BASIC (A=INP(0) reads stick) and convert BASIC programs to Joystick control.

MODEL I - Plugs directly into any Level II Keyboard (card edge on rear) or expansion interface (left side, next to printer port).

MODEL III - Works with any Model III BASIC system and plugs into the 50 pin I/O bus (largest edge connector underneath).

THE ALPHA JOYSTICK

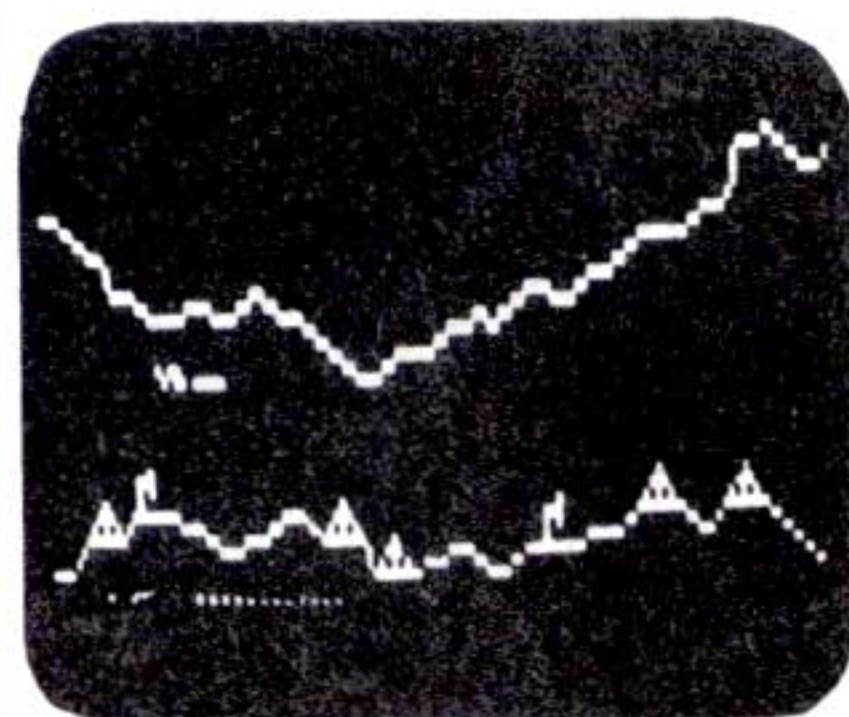
ONLY \$39.95

MODEL I OR III, SPECIFY WHEN ORDERING. PRICE INCLUDES ATARI JOYSTICK + ALPHA INTERFACE + INSTRUCTIONS + DEMO PROGRAM LISTING

14 DAY MONEY BACK GUARANTEE - if you are not delighted, return it within 14 days for a prompt and courteous refund.

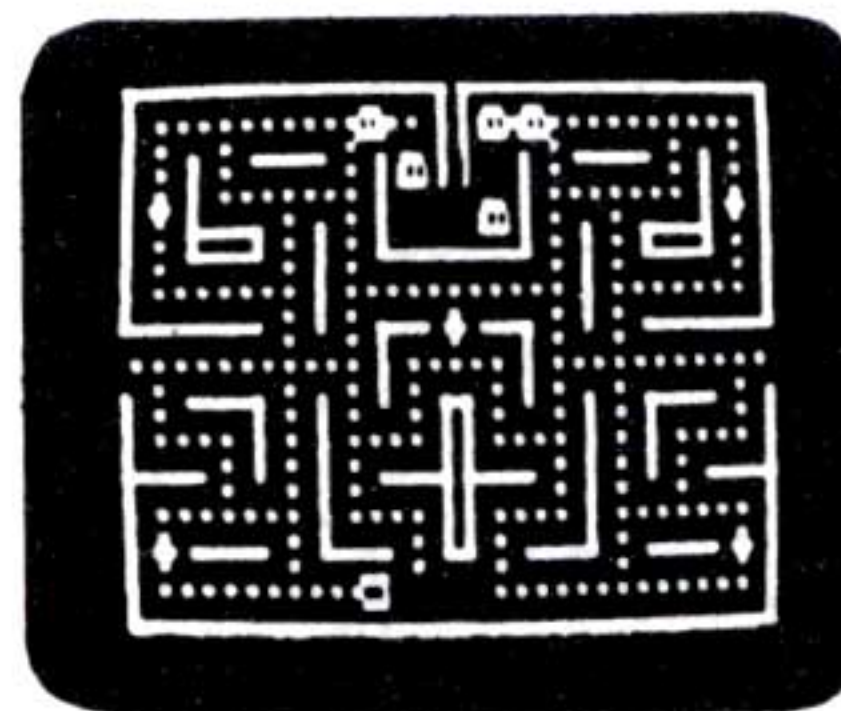
Choose from any of the Joystick Compatible games below. Be sure to mention the "Sweet Deal" discount when ordering.

Joystick + 1 game Deduct \$ 6.00
Joystick + 2 games Deduct \$12.00
Joystick + 3 games Deduct \$14.00



PENETRATOR

Soar swiftly over jagged landscape, swooping high and low to avoid obstacles and enemy missile attacks. With miles of wild terrain and tunnels to penetrate, you're well armed with bombs and multiple forward missile capability. From Melbourne House. Features sound, trainer mode and customizing program.



• • SCARFMAN

This incredibly popular game craze now runs on your TRS-80! It's eat or be eaten. You control Scarfman around the maze, gobbling up everything in your path. Try to eat it all before nasty monsters devour you. Excellent high speed machine language action game from the Cornsoft Group. With sound.



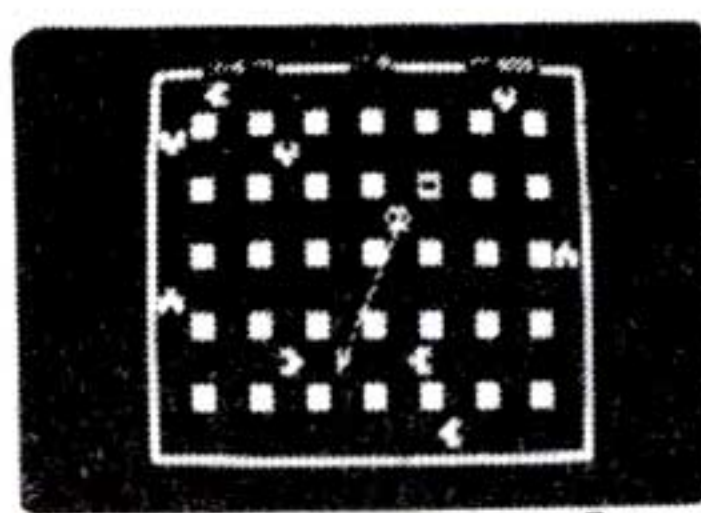
SUPER NOVA®

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! Big asteroids break into little ones - your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May 1981 Byte Magazine.



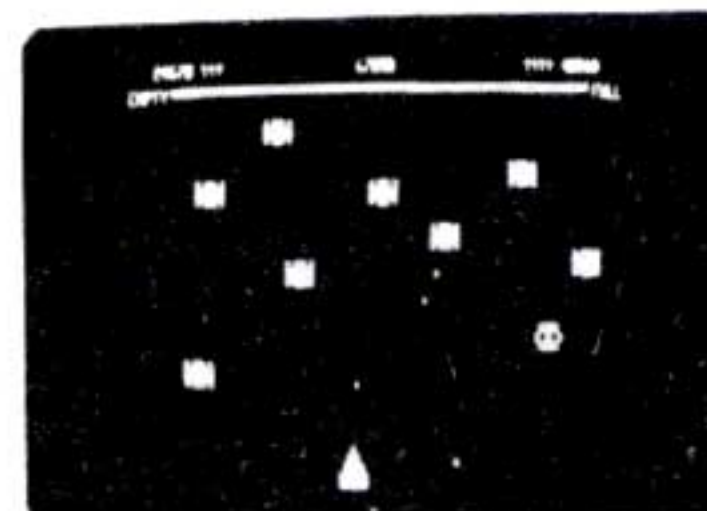
LUNAR LANDER

As a vast panoramic moonscape scrolls by, select one of many landing sights. The more perfect the spot, the more points scored. If you can land safely, you control T.M. main engines and side thrusters. Absolutely the best use of TRS-80 graphics we have ever seen! From Adventure International. With sound.



ATTACK FORCE®

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get too good, you must endure the Flag ship. With sound effects!



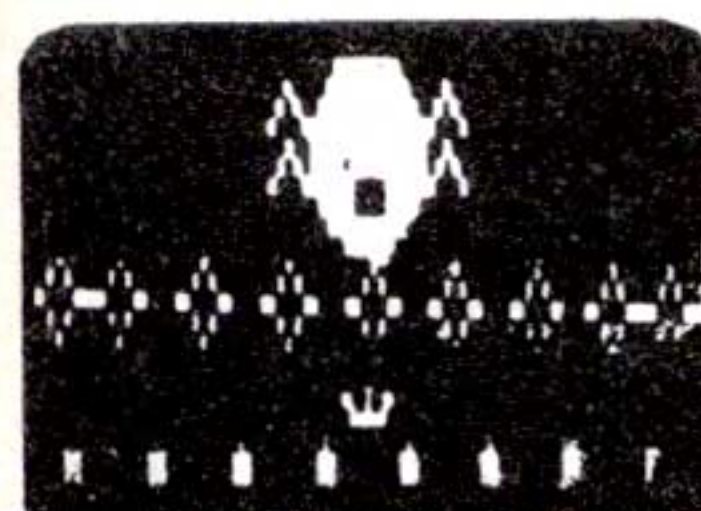
COSMIC FIGHTER®

Your ship comes out of hyperspace under a convoy of aliens. You destroy every one. But another set appears. These seem more intelligent! You eliminate them, too. Your fuel supply is diminishing. You must destroy two more sets before you can dock. The space station is now on your scanner. With sound!



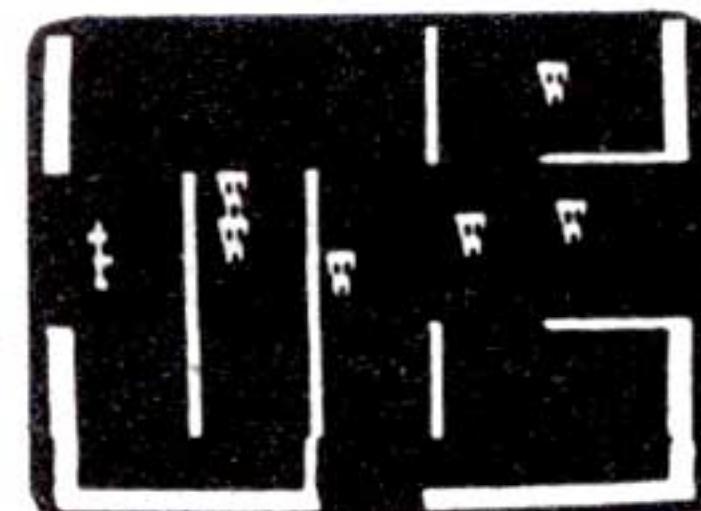
GALAXY INVASION®

The sound of the Flaxon is calling you! Invaders have been spotted warping toward Earth. You shift right and left as you fire your lasers. A few break formation and fly straight at you! You place your finger on the fire button knowing that this shot must connect! With sound effects!



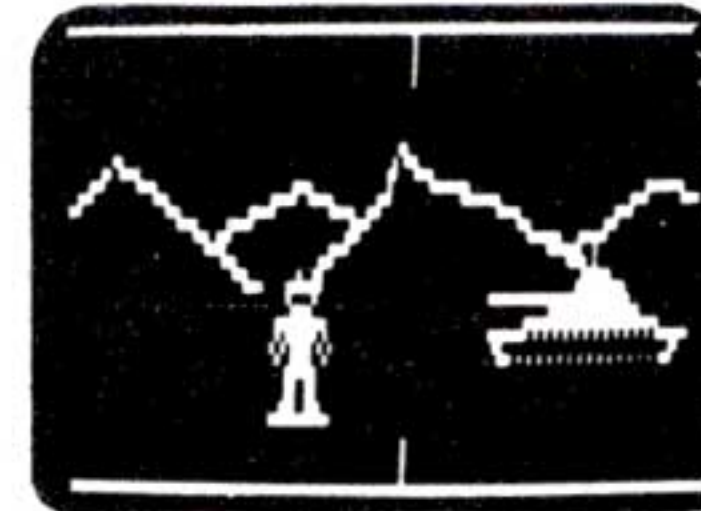
DEFENSE COMMAND

The invaders are back! Alone, you defend the all important nuclear fuel canisters from thieving aliens who attack repeatedly. An alien passes your guard, snatches up a canister and flies straight off. Quick! You have one last chance to blast him out of the sky! With sound and voice.



TALKING ROBOT ATTACK

This game TALKS without a voice synthesizer through the cassette port. With just a hand laser in a remote section of the space station, you encounter armed robots. Some march towards you, more wait around corners. Careful, the walls are electrified. Zap as many robots as you dare before escaping to a new section. More robots await you.



ARMORED PATROL

A realistic tank battle simulation. Your view is a 3-D perspective of an alien landscape. Maneuver your T-36 tank to locate and destroy enemy tanks and robots that lay hidden, ready to assault you. Clever graphics create the illusion of movement and dimension. From Adventure International. With sound.

16

GAME PRICES

"Penetrator" Disk or 2 Cassette Package \$24.95
"Armored Patrol" Cassette \$19.95 Disk \$24.95
ALL OTHER GAMES:
16K Level 2, Model 1 + Model 3 Cassette \$15.95
32K Level 2, Model 1 + Model 3 Diskette \$19.95

These games are "Alpha Joystick Compatible." They may be played with or without Joystick (using arrow keys).

Toll Free Order Line
800-221-0916

ORDERS ONLY HOURS 9 AM - 5:30 PM, E.S.T.
FOR INFO CALL (212) 296-5916

ADD \$2.00 PER ORDER FOR SHIPPING AND HANDLING
WE ACCEPT VISA, MASTERCARD, CHECKS, M.O.
C.O.D. ADD \$3.00 EXTRA
NY RESIDENTS ADD SALES TAX
OVERSEAS, F.P.O. A.P.O. ADD 10%
DEALER DISCOUNTS AVAILABLE



ALPHA Products

79-04 Jamaica Ave., Woodhaven, NY 11421

(212) 296-5916

You can substitute any other letter or number here if you like.

The data statements are read for a third time in line 510 to establish the trend line.

The values for the regression line are calculated starting at line 590. The three-period projection is figured starting at line 610.

Line 640 prints the projected values, using the small letter "o" to make the bar. Again, you may choose whatever you like here.

After your chart is printed, you can run a straight line through the last three o's and see your trend line.

We have found these plots both useful and fun to use. Try them, they are both short and easy to type in.

Listing 1 PLOT1

```

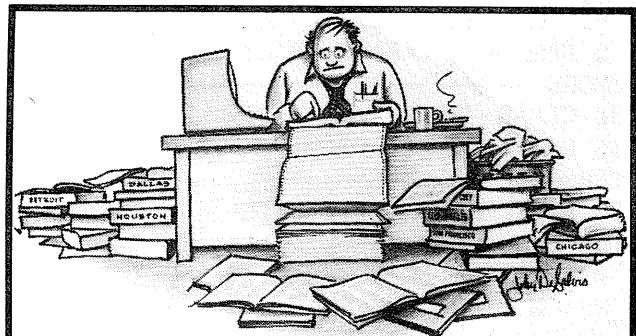
10 REM PROGRAM NAME IS PLOT1: (C) 1982
80-NW PUBLISHING INC.
20 REM *****
30 REM *
40 REM * VARIABLE SCALE GRAPH PLOTTER *
50 REM * FOR MODEL II/16 WITH *
60 REM * 80 COL PRINTER AND VIDEO *
65 REM *****
70 CLS: CLEAR 200: DIM N$(24), X(24)
80 PRINT STRING$(79, "_")
90 PRINT
100 PRINT TAB(17); "MODEL II/16 GRAPH PLOTTER FOR UP TO 20 ITEMS"
110 PRINT TAB(20); "FOR USE WITH/WITHOUT 80-COLUMN PRINTER"
120 PRINT STRING$(79, "_")
130 PRINT: PRINT
140 PRINT "YOU CAN ENTER UP TO 20 DIFFERENT NAMES AND ITEMS. FOR INSTANCE:"
150 PRINT "ENTER A LABEL NAME, FOLLOWED BY A COMMA, THEN THE VALUE."
160 PRINT
170 PRINT "MAX SCALE VALUE IS A NUMBER LARGER THAN THE LARGEST VALUE TO BE ENTERED."
180 PRINT
190 PRINT "ENTER 0,0 TO END INPUT OF ITEMS."
200 PRINT
210 INPUT "ENTER A '1' NOW IF YOU WANT THE GRAPH TO DUMP TO THE PRINTER, IF NOT, JUST PRESS ENTER"; AA
220 PRINT "USE THE <BREAK> KEY TO EXIT THE GRAPH."
230 REM INPUT SCALE, NAMES AND VALUES
240 PRINT: INPUT "MAXIMUM SCALE VALUE "; S: S = S / 100
250 CLS: PRINT: FOR Z = 2 TO 21

```

```

260 PRINT "ITEM #"; Z-1; : INPUT " - NAME, VALUE "; N$(Z), X(Z)
270 IF LEN(N$(Z)) > 9 THEN PRINT "NAMES LIMITED TO 9 CHARACTERS ": GOTO 260
280 IF X(Z) > 100 * S THEN PRINT "VALUES LIMITED TO A MAXIMUM OF"; 100 * S: GOTO 260
290 IF N$(Z) = "" THEN Z = Z - 1: GOTO 310
300 NEXT Z
310 REM ANNOTATE TOP OF GRAPH
320 CLS
330 FOR I = 0 TO 50 STEP 5
340 PRINT @I + 10, INT(20 * I * S) / 10
350 NEXT I
360 REM DRAW TOP LINE OF GRAPH
370 FOR I = 0 TO 62
380 PRINT CHR$(152);
390 NEXT I
400 REM PRINT NAMES AND VALUES
410 S = S * 2
420 FOR I = 0 TO Z
430 PRINT @I * 80, N$(I); : PRINT @I * 80 + 12, STRING$(X(I) / S, CHR$(150))
440 NEXT I
450 REM DRAW THE VERTICAL LINES
460 FOR I = 2 TO 22

```



IS THIS YOU?

You know you saw their ad in one of those magazines stacked in the corner... but which one? You are ready to buy their hard/soft Thing-a-magig, but how are you going to find them? What can you do?

THE COMPUTERIST'S DIRECTORY YELLOW PAGES is the one national reference to companies (large and small) and individuals producing and selling the hardware, software, services and supplies that you need. Extensive indexing and cross referencing by product makes it easy to find what you are looking for in the personal and small business field.

THE COMPUTERIST'S DIRECTORY WHITE PAGES list Individuals, Clubs, Associations and Bulletin boards including network I.D. Numbers (Source, CompuServe etc) and a short description of their interests and projects. Find people and clubs who share your interests. Form local and national networks. And if your computer nomenclature is rusty... Just check with the Glossary included in each issue. All from the Computerist's Directory White Pages!

THE COMPUTERIST'S DIRECTORY is published twice each year. A one year subscription costs just \$10.00 and includes a free listing in the White Pages and two issues of the Directory, one in January and one in July. It's the best investment you'll make this year!

YOU ONLY HAD TO LOOK IN ONE PLACE!

**the
Computerist's
Directory**



The National Phone Book of Computing

PO BOX 405
FORESTVILLE, CA 95436

(707) 887-1857

17

Two graphs

```

470 PRINT@I*80+11,CHR$(139)
480 PRINT@I*80+24,CHR$(124)
490 PRINT@I*80+37,CHR$(124)
500 PRINT@I*80+49,CHR$(124)
510 PRINT@I*80+62,CHR$(137)
520 NEXTI
530 REM ----- CLOSE BO
TTOM WITH LINE -----
540 PRINT@1760,STRING$(62,CHR$(150))
550 REM ----- PRINTER OPTION --
-----
560 IF AA=1 THEN SYSTEM "SCREEN"
570 GOTO570

```

Listing 2 PLOT 2

```

5 REM LINE NUMBERS ENDING IN 5 NEED NOT
  BE TYPED IN, USE AUTO
10 REM PROGRAM NAME IS: PLOT2 : (C) 198
2 80-NORTHWEST PUBLISHING INC.
20 REM *****
30 REM *
40 REM * MOD II/16 GRAPH PLOTTER *
50 REM * WITH PRINTER AND THREE *
60 REM * PERIOD PROJECTION *
62 REM *****
65 REM ----- THE NEXT LINE IS TO SET SOM
E PRINTERS, DELETE IF YOU DON'T NEED IT
.
70 LPRINTCHR$(29):REM-----SETS MICROLIN
E
80 PRINTER TO 132 CHAR MODE
75 REM ----- CLEARS ABOUT ONE THIRD OF M
EMORY -----
80 CLEAR (2*MEM)/3
85 REM ----- SET FORMS ON YOUR LINE PRIN
TER -----
90 SYSTEM "FORMS {P=66,L=66,W=132}"
100 CLS
105 REM ----- PRINT HEADING AND INSTRUCTI
ONS ON VIDEO SCREEN -----
110 PRINTSTRING$(79,"_")
120 PRINT
130 PRINTTAB(10);"MODEL II/16 GRAPH PLO
TTER WITH THREE PERIOD PROJECTION"
140 PRINTTAB(20);"FOR USE WITH 132 CHAR
ACTER LINEPRINTER"
150 PRINTSTRING$(79,"_")
160 PRINT
170 PRINT
180 PRINT"The data for this program mus
t be entered as DATA lines at the"
190 PRINT"end of the program. The form
of these DATA statements is:"
200 PRINT" DATA LABEL,####"
210 PRINT"where LABEL is a name and ###
# is a numeric value."

```

```

220 PRINT
230 PRINT"The very last DATA statement
should contain a dummy label and a"
240 PRINT"numeric value of -1, like thi
s: DATA ,-1"
250 PRINT
260 PRINT"The program will automaticall
y save itself after it is run"
270 PRINT"to save DATA statements that
has been entered or added to."
280 PRINT
290 PRINT"Line up your printer paper an
d ENTER to continue":INPUT;
295 REM ----- YOU CAN PUT YOUR OWN GRAPH
NAME IN THE NEXT LINE -----
300 LPRINTTAB(40);"GRAPH NAME"
310 LPRINT" "
315 REM ----- YOU CAN PUT YOUR OWN LABEL
(9 CHARS OR LESS) IN THE NEXT LINE --
320 LPRINT"LABEL";:LPRINTTAB(10);"0";TA
B(20);"1";TAB(30);"2";TAB(40);"3";TAB(5
0);"4";TAB(60);"5";TAB(70);"6";TAB(80);
"7";TAB(90);"8";TAB(100);"9";TAB(110);"
1"
330 :LPRINTTAB(10);"!";TAB(15);"!";TAB(
20);"!";TAB(25);"!";TAB(30);"!";TAB(35)
;"!";TAB(40);"!";TAB(45);"!";TAB(50);"!
";TAB(55);"!";TAB(60);"!";TAB(65);"!";T
AB(70);"!";TAB(75);"!";TAB(80);"!";TAB(
85);"!";TAB(90);"!";TAB(95);"!";TAB(100
);"!";
340 LPRINTTAB(105);"!";TAB(110);"!"
345 REM ----- FIND THE HIGHEST DATA VALUE
SO YOU CAN SET THE SCALE -----
350 D2=0
360 FORJ=1TO1000
370 READA$,D:IFD=-1THEN GOTO 410
380 IFD>D2 THEN D2=D
390 IFD2<100 THEN D1=1 ELSE IF D2<1000
THEN D1=10 ELSE IF D2<10000 THEN D1=100
ELSE IF D2<100000 THEN D1=1000
400 NEXTJ
405 REM ----- RESTORE THE DATA FOR THE N
EXT READING OF IT -----
410 RESTORE
415 REM ----- READ THE DATA, SCALE IT AN
D PRINT IT OUT -----
420 FOR J = 1 TO 1000
430 READ A$,D
440 IF D= -1 THEN GOTO 500
450 C=C+1
460 L=(D/D1)+1
470 LPRINTA$,TAB(10);STRING$(L,"X");TAB
(120);D
480 NEXTJ
490 END

```


Two graphs

```

500 RESTORE
505 REM ----- READ THE DATA AGAIN FOR TH
E TREND LINE -----
510 FOR J = 1 TO C
520 Q=J
530 READ A$,D
540 R=R+D
550 S=S+Q
560 U=U+Q*D
565 REM ----- USE THE 'SHIFT 6' KEY TO G
ET THE CARET (RAISE TO A POWER) -----
570 T=T+Q^2
580 NEXT J
585 REM ----- FIGURE THE VALUES FOR THE
REGRESSION LINE -----
590 Y=(T*R-S*U)/(C*T-S^2):REM USE 'SHIF
T 6' FOR THE CARET (RAISE TO A POWER)
600 X=(C*U-S*R)/(C*T-S^2)
605 REM ----- FIGURE THE THREE PERIOD PR
OJECTION AND PRINT IT -----
610 FOR F = C+1 TO C+3
620 F1=Y+X*F:IF F1 <=0 THEN PRINT"CAN'T
PRINT NEGATIVE NUMBERS": GOTO 720
630 L=(F1/D1)+1
640 LPRINT"PROJ";TAB(10);STRING$(L,"o")
;TAB(120);F1
650 NEXT F
660 LPRINT" "
665 REM ----- PRINT THE VALUES FOR THE R
EGRESSION LINE -----
670 LPRINT"THE X & Y FOR THE REGRESSION
LINE ARE:"
680 LPRINT"Y=";Y;"+";X;"X"
685 REM ----- GIVE THE PRINTER A 'TOP OF
FORM' COMMAND -----
690 SYSTEM "FORMS T"
695 REM ----- SAVE THE PROGRAM ON DRIVE
0 -----
700 PRINT"Now saving program on drive 0
"
710 SAVE"PLOT2:0"
720 PRINT"DONE"
730 END
735 REM ----- HERE IS WHERE YOU PUT YOUR
DATA STATEMENTS - THOSE HERE ARE FOR
SHOW ONLY. YOU CAN HAVE AS MANY
AS THERE ARE SPACE FOR IN MEMORY.-----
740 DATA JAN 82, 3200
750 DATA FEB 82, 3850
760 DATA MAR 82, 4329
770 DATA APR 82, 5560
780 DATA MAY 82, 6430
790 DATA JUN 82, 6028
800 DATA JUL 82, 6500
810 DATA AUG 82, 6340
820 DATA SEP 82, 6210
830 DATA ,-1

```

TRS-80* Model III

Hardware &
Software
at discount
prices.

COMPUTER HOUSE

ACORN SOFTWARE

Sug. List.	Our Price
Astro Ball (T or D).....	19.95
Everest Explorer (T or D).....	19.95
Invaders From Space (T).....	14.95
Lost Colony (T or D).....	19.95
Money Manager (D).....	39.95
Space Rocks (T or D).....	19.95
Superscript (D).....	50.00

ADVENTURE INTERNATIONAL

Adventures 1 thru 12 (T) each.....	19.95	15.95
Escape From Traam (T).....	19.95	15.95
Maxi Manager (D).....	99.95	79.95
Star Fighter (T).....	24.95	19.95
Star Trek 3.5 (T).....	14.95	11.95
Stone of Sisyphus (D).....	29.95	23.95
The Curse of Crowley Manor (T).....	19.95	15.95

AUTOMATED SIMULATIONS

Crush, Crumble & Chomp (T or D).....	29.95	23.95
Date Stones of Ryn (T or D).....	19.95	15.95
Rescue At Rigel (T or D).....	29.95	23.95
Star Warrior (T or D).....	39.95	31.95
Tuesday Morning Quarterback (D).....	29.95	23.95

BIG FIVE SOFTWARE

Attack Force (T).....	15.95	12.75
Galaxy Invasion (T).....	15.95	12.75
Meteor Mission 2 (T).....	15.95	12.75
Robot Attack (T).....	15.95	12.75
Super Nova (T).....	15.95	12.75

BRODERBUND SOFTWARE

Galactic Empire (T).....	14.95	11.95
Galactic Revolution (T).....	14.95	11.95
Galactic Trader (T).....	14.95	11.95
Galactic Trilogy (D).....	39.95	31.95
Tawala's Last Redoubt (T).....	19.95	15.95

THE CORNSOFT GROUP

Scarfman (C).....	15.95	12.75
-------------------	-------	-------

DATASOFT

Arcade - 80 (T).....	19.95	15.95
----------------------	-------	-------

HAYDEN SOFTWARE

Sargon II (D).....	34.95	27.95
--------------------	-------	-------

MED SYSTEMS

Asylum (T).....	14.95	11.95
Asylum (D).....	19.95	15.95
Deathmaze 5000 (T).....	14.95	11.95
Labyrinth (T).....	14.95	11.95

MICROSOFT

Adventure (D).....	29.95	23.95
Olympic Decathlon (T).....	24.95	19.95

RADIO SHACK

26-2204 Compiler Basic (D).....	149.00	119.20
26-1552 General Ledger (D).....	99.95	79.95
26-1553 Inventory Control I (D).....	99.95	79.95
26-2014 Model III Disk Course (D).....	29.95	23.95
26-1596 Model III Visicalc (D).....	199.00	155.00
26-1556 Payroll (D).....	199.95	155.95
26-1592 Profile III Plus (D).....	199.00	155.00
26-1590 Super Script (D).....	199.00	155.00

STRATEGIC SIMULATIONS

Tigers In The Snow (T).....	24.95	19.95
-----------------------------	-------	-------

SYNTONIC SOFTWARE

Interlude (T).....	18.95	15.15
--------------------	-------	-------

(T) = Cassette Tape (D) = Disk

REPRESENTING OVER 20+ COMPANIES WITH 300+ PROGRAMS AND HARDWARE.

WRITE FOR FREE MODEL II, III OR COLOR COMPUTER CATALOGS TO:

Computer House

P.O. Box 538, Mammoth Lakes, CA 93546

(714) 934-6538

Terms: FOR FAST DELIVERY, send certified checks, money orders or Visa or MasterCard number and expiration date. Personal checks require 3 weeks to clear. ADD \$1.50 for postage. Orders over \$100 we pay shipping. All foreign orders add \$10. CALIFORNIA residents add 6% tax. Prices subject to change.

18

* TRS-80 is a trademark of Tandy Corp.

Birth of a legend.



Epson.

A whole new generation of Epson MX printers has just arrived. And while they share the family traits that made Epson famous — like unequalled reliability and ultra-fine printing — they've got a lot more of what it takes to be a legend.

For instance, they've got a few extra type styles. Sixty-six, to be exact, including italics, a handy subscript and superscript for scientific notation, and enough international symbols to print most Western languages.

What's more, on the new-generation MX-80, MX-80 F/T and MX-100, you get GRAFTRAX-Plus dot addressable graphics. Standard. So now you can have precision to rival plotters in a reliable Epson printer. Not to mention true backspace, software printer reset, and programmable form length, horizontal tab and right margin.

All in all, they've got the features that make them destined for stardom. But the best part is that beneath this software bonanza beats the

3415 Kashiwa Street • Torrance, CA 90505 • (213) 539-9140

September, 1982 37

Color Computer assembler/disassembler

Get inside your 6809E

Color Computer

Richard Tangeman, Arkansas State University, AK

The 6809E Assembler in BASIC

The 6809E is one of the most modern and powerful 8-bit microprocessors. Because of its 16-bit index register, dual stacks, and well-chosen instruction set, it is probably easier to program than either the Z-80 or 6502. In order to explore these features, I decided to write an assembler in BASIC for my 16K Color Computer. The results of my effort appear here.

The full instruction set and all addressing modes are supported, along with some handy pseudo-ops. In order to save memory, the assembler itself has very fancy features, but symbolic addresses and forward references are supported. A small but adequate source language editor is included, along with routines to save source code on tape and load it back into memory. Once a program is assembled, the binary output of the assembler may be loaded into memory and executed.

The standard 6809E instruction set consists of 139 different mnemonics, most of which can be used with several different addressing modes. After the assembler is correctly typed in and saved to tape, run the program and hit BREAK in response to the first input prompt. Then, execute from the direct mode:

```
FOR K = 1 TO 139:PRINT K,LEFT$(MN$(K),4):NEXT K
```

This displays to the screen the available mnemonics. They are all standard except that ANDC is used instead of ANDCC.

Operands

Where operands are present, the object code output of the assembler depends heavily on operand format. Table 1 lists these formats and every operand should match one of these exactly. The assembler depends on operand lengths in particular, so be sure not to add any blanks. In Table 1, ** denotes any two-character hexadecimal constant and **** denotes a four-character

hexadecimal constant or symbolic address (more on symbolic addresses later). W denotes any of the 16-bit registers S, Y, U or S. Where indirection is allowed, the operand may be optionally enclosed in square brackets.

The allowable operands for transfer and exchange instruction are all three characters long. Legal types are: M,N where each of M and N is one of the 8-bit registers A, B, C or Z; (C is the condition code register and Z is the direct page register) and V,W where each of V and W is one of the 16-bit registers D, X, Y, U, S, P. The operand for a push or pull instruction may be a single register or a list of registers separated by commas. D may not be used since it is really a pseudoregister. Instead of U or S, use the symbol †. Thus instead of PULS D,U we would use PULS A,B,†. The order in which the registers appear is not important. Notice that the operand length would always be odd in this case.

Symbolic Labels

Any line may carry an optional label. Where present, a label must be exactly four characters long. The first character must be alphabetic and not a legal hex digit (G - Z). The other three characters should be alphanumeric (0 - 9 or A - Z). Labels are used to provide symbolic addresses and word constants, and any four-character hex constant in an operand may be replaced with a four-character symbolic label. (The DATA statement is an exception to this.)

Pseudo-ops

There are three pseudo-ops in addition to END. They are: EQU, ORG and DATA. These appear in the mnemonic field, and all require operands. EQU is used to set up symbolic word constants and (normally external) addresses. Thus instead of using JSRA1C1, we could declare a symbolic address: GRAB EQU A1C1 followed at some later point in the program by JSR GRAB. A statement of the form LDX #GRAB would also be legal. All EQU statements should appear at the

beginning of the program.

ORG sets the location counter, and usually would appear just once, after the EQU statements. Its operand is a four-character hexadecimal address, either a hex value or a previously defined symbolic location. The DATA pseudo-op provides a way to load ASCII or hex values at any desired location. It requires an operand, which may be either a string of ASCII characters enclosed by single quotes (apostrophes) or a string of hexadecimal characters having even length. Thus DATA 'ABC' and DATA 414243 would have exactly the same effect: loading 3 bytes starting at the present location. As usual, it is the responsibility of the programmer to keep data out of the line of execution.

The END statement must appear exactly once in a program, in the last line. It should not have a label, and must have an operand. The operand should be a four-character address, hex or symbolic. This address defines the starting address for execution after the program is assembled and loaded, and need not be the physical beginning of the program. Table 2 provides examples of correct usage of all the pseudo-ops. It is a simple program which prints a message to the center of the screen.

The Editor

To type in a program, RUN the assembler. You will be prompted three times for each line: label, mnemonic and operand. If a field is to be blank, just hit ENTER to get the next prompt. The input routine will loop until it receives END in the mnemonic field, at which point it asks for the final operand and then enters a keyboard scan routine. A description of the function of each of the several active keys follows.

L: — Lists the program. If it is longer than 15 lines, you will need to use shift @ to interrupt the list.

CLEAR: — Clears the screen.

D: — Prompts for a line number and then deletes that line.

R: — Prompts for a line number and then allows replacement of any one of the three fields for that line.

I: — Prompts for a line number and then inserts a blank line (three blank fields) after that line.

M: — Executes PRINT MEM.

T: — Enters a tape routine, which allows saving the present program or loading a previously saved one. Prompts are provided.

A: — Assembles the program. The object codes are loaded into a string array OC\$(I). If there are forward references, the assembler will so indicate, possibly with an error message, but it will keep assembling in order to complete the symbol table. In this case, error or not, just assemble again. If there are no other problems, the second assembly should be complete and correct.

O: — Lists the opcodes and symbol table. Shift @ may be needed:

P: — POKEs the machine code into memory for execution.

E: — Executes the program via a USR call. Thus the logical end of your program should normally be RTS, returning control to the keyboard scan routine.

If your program is long, it is probably worth saving to

tape before execution is attempted. A number of bad things can happen when running machine language, and the assembler may not catch all errors.

Memory Management

String space, graphics pages and array sizes are declared in line 5.

If your program is longer than 50 lines, you will need to increase the sizes of all the arrays and probably declare more string space. The PCLEAR3 may be changed to PCLEAR2 or PCLEAR1 with a gain of 1.5K of space for each graphics page given up. You may wish to give up the M and CLEAR commands of the monitor by deleting the appropriate lines. There are a few comments which can be removed. It is also possible to save a little space by renumbering very tightly, i.e. RENUM 1,,1.

Table 1

OPERAND	LENGTH	DESCRIPTION	EXAMPLE	INDIRECTION
###	3	byte immediate	LDA #5A	no
####	5	word immediate	LDY #A000	no
**	2	direct page	DEC B3	no
****	4	extended	TST 0620	yes
+,W	5	5-bit offset	STB +0C,U	no
-,W	5	5-bit offset	CMPLY -03,X	no
,W+	3	postincrement	LDB ,X+	yes
,W++	4	postincrement by 2	STB ,Y++	yes
,-W	3	predecrement	LSR ,S	yes
,--W	4	predecrement by 2	CLR ,--X	yes
,W	2	simple index	LDA ,X	yes
A,W	3	accumulator offset	STB A,Y	yes
B,W	3	accumulator offset	LDA B,X	yes
D,W	3	accumulator offset	STY D,X	yes
*,W	4	8-bit offset	STB 23,Y	yes
****,W	6	16-bit offset	LDX 123B,Y	yes
*,PCR	6	8-bit offset	LDA 23,PCR	yes
****,PCR	8	16-bit offset	LDX 1234,PCR	yes

Table 2

Sample program using the Assembler

1	MIDL	EQU	050D
2		ORG	0600
3		DATA	'ABCDEF'
4		DATA	00
5	STRT	LDX	#MIDL
6		LDY	#0600
7	MORE	LDA	,Y+
8		TSTA	
9		BEQ	QUIT
10		STA	,X+
11		BRA	MORE
12	QUIT	RTS	
13		END	STRT

Listing 1 for Assembler

```
5 PCLEAR3: CLEAR500: S=50: DIM L$(S), M$(S)
, O$(S), AD$(S), OC$(S): GOSUB 445: I=0: R$="DX
YUSPABCZ": N$="01234589AB": S$="CABZXY^P"
10 I=I+1: INPUT "LBL"; L$(I): INPUT "MNE"; M$(I): LINE INPUT "OPD?"; O$(I)
```



```

15 IFM$(I)="END"THENN=I:ELSE10
20 X$=INKEY$:IFX$="L"THEN70
25 IFX$=CHR$(12)THENCLS
30 IFX$="M"THENPRINTMEM
35 IFX$="E"THENE=USR1(0)
40 IFX$="I"THEN85
45 IFX$="O"GOSUB620
50 IFX$="P"GOSUB770
52 IFX$="T"THEN910
55 IFX$="D"THEN105
60 IFX$="A"THEN160
65 IFX$="R"THEN120ELSE20
70 FORI=1TON
75 PRINTI;TAB(3)LS(I)TAB(9)M$(I)TAB(14)
O$(I)TAB(21)OC$(I)
80 NEXTI:GOTO20
85 INPUT"AFTER";K:N=N+1
90 FORQ=N+1TOK+1STEP-1
95 LS(Q)=LS(Q-1):M$(Q)=M$(Q-1):O$(Q)=O$(Q-1)
100 NEXTQ:LS(K+1)="" :M$(K+1)="" :O$(K+1)="" :GOSUB155:GOTO20
105 INPUT"#";K:FORI=K TON
110 LS(I)=LS(I+1):M$(I)=M$(I+1):O$(I)=O$(I+1)
115 NEXTI:N=N-1:GOSUB155:GOTO20
120 INPUT"#";K
125 PRINT"L M O"
130 X$=INKEY$:IFX$=""THEN130
135 IFX$="L"THENPRINTLS(K):INPUTLS(K)
140 IFX$="M"THENPRINTM$(K):INPUTM$(K)
145 IFX$="O"THENPRINTO$(K):LINEINPUT"?";O$(K)
150 GOSUB155:GOTO20
155 FORI=1TO N:OC$(I)="" :NEXTI:RETURN
159 REM ASSEMBLE
160 GOSUB155:FORI=1TON-1:PRINTI;
170 M$=M$(I):O$=O$(I):OC$="" :LO=LEN(O$):PB=0
180 IFM$="ORG"ORM$="EQU"THENGOSUB725:AD(I)=VAL("&H"+Q$):GOTO435
181 IFM$<>"DATA"THEN185
182 IFASC(O$)<>39THENOCS(I)=O$:GOTO185
183 FORQ=2TOLO-1:OC$(I)=OC$(I)+HEX$(ASC(MID$(O$,Q,1))):NEXTQ
185 AD(I)=AD(I-1)+.5*LEN(OC$(I-1))
186 IFM$="DATA"THEN435
190 IFM$="TFR"ORM$="EXG"THEN825
195 IF LEN(M$)=3 THEN M$=M$+" "
200 FOR J=1 TO M
205 T$=LEFT$(MN$(J),4)
210 IFT$<>M$THEN220
215 T$=MN$(J):LT=LEN(T$):GOTO225
220 NEXTJ:GOTO440
225 IF ASC(T$)=80 THEN865
230 GOSUB600:REM PREBYTE
235 IF LO=0 THEN245
40 80-U.S. Journal

```

```

240 GOSUB 565:IF II=1 OR CP>0 THEN 280:
REM INDEX/IND
245 IF LT>6 THEN 255
250 OC$(I)=RIGHT$(T$,2)+MID$(O$,2):GOTO 425
255 IFLO=3 OR LO=5 THENBP=5:LO=LO-1:GOT 0270
260 IFLO=2THENBP=7
265 IFLO=4THENBP=9
270 O$=RIGHT$(O$,LO):IF LO=4 GOSUB 725:O$=Q$
275 OC$(I)=MID$(T$,BP,2)+O$:GOTO 425
280 OC$(I)=MID$(T$,11,2)
285 PB=128+16*II:FOR Q=LO TO LO-2 STEP -1
290 Q$=MID$(O$,Q,1):RV=0
295 IF Q$="X"THEN320
300 IF Q$="Y" THEN RV=32:GOTO320
305 IF Q$="U" THEN RV=64:GOTO320
310 IF Q$="S" THEN RV=96:GOTO320
315 NEXT Q
320 PB=PB+RV:DV$=""
325 ON LO GOTO 440,330,355,385,335,400,440,410
330 PB=PB+4:GOTO415
335 PB=VAL("&H"+MID$(O$,2,2))
340 IF ASC(O$)=45 THEN PB=-PB
345 PB=PB AND 31:PB=PB+RV
350 DV$="" :GOTO415
355 Q1$=LEFT$(O$,1):Q3$=RIGHT$(O$,1)
360 IF Q1$="A" THEN PB=PB+6:GOTO415
365 IF Q1$="B" THEN PB=PB+5:GOTO415
370 IF Q1$="D" THEN PB=PB+11:GOTO 415
375 IF Q3$="+" THEN 415
380 PB=PB+2:GOTO 415
385 IF ASC(O$)=ASC(",") THEN PB=PB+1:GO TO415
390 IFCP=0 GOSUB725:PB=&H9F:DV$=Q$:GOTO 415
395 PB=PB+8:DV$=LEFT$(O$,2):GOTO 415
400 IF MID$(O$,5,1)=", " THEN PB=PB+9:O$=LEFT$(O$,4):GOSUB725:DV$=Q$:GOTO 415
405 PB=PB+12:DV$=LEFT$(O$,2):GOTO 415
410 O$=LEFT$(O$,4):GOSUB725:DV$=Q$:PB=PB+13
415 PB$=HEX$(PB):IF LEN(PB$)=1 THEN PB$="0"+PB$
420 OC$(I)=OC$(I)+PB$
425 OC$(I)=PR$+OC$(I)+DV$
430 GOSUB630
435 DV$="" :NEXTI:PRINT"OK":GOTO20
440 GOSUB900:GOTO20
445 M=139:DIM MN$(M):FOR I=1TOM
450 READMN$(I):NEXT:RETURN
455 DATAABX 3A,ADCA8999B9A9,ADCB9D9F9E 9,ADDA8B9BBAB,ADDBCDBFBEB,ADDDC3D3F3E 3,ANDA8494B4A4

```



```

460 DATAANDBC4D4F4E4,ANDC1C?????,ASL ?
?087868,ASLA48,ASLB58,ASR ??077767,ASRA
47,ASRB57
465 DATABCC ????24??,BCS ????25??,BEQ ?
???27??,BGE ????2C??,BGT ????2E??,BHI ?
???22??
470 DATABHS ????24??,BITA8595B5A5,BITBC
5D5F5E5,BLE ????2F??,BLO ????25??,BLS ?
???23??
475 DATABLT ????2D??,BMI ????2B??,BNE ?
???26??,BPL ????2A??,BRA ????20??,BRN ?
???21??,BSR ????8D??,BVC ????28??,BVS ?
???29??
480 DATACLR ??0F7F6F,CLRA4F,CLRB5F,CMPA
8191B1A1,CMPBC1D1F1E1,CMPD8393B3A3A,CMP
S8C9CBCACB
485 DATACMPU8393B3A3B,CMPX8C9CBCAC,CMPY
8C9CBCACA,COM ??037363,COMA43,COMB53,CW
AI3C??????,DAA 19
490 DATADEC ??0A7A6A,DECA4A,DECB5A,EORA
8898B8A8,EORBC8D8F8E8,EXG 1E??????,INC
??0C7C6C,INCA4C
495 DATAINCB5C,JMP ??0E7E6E,JSR ??9DBDA
D
500 DATALBCC????24A,LBCS????25??A,LBEQ?
???27??A,LBGE????2C??A
505 DATALBGT????2E??A,LBHI????22??A,LBH
S????24??A,LBLE????2F??A,LBLO????25??A,
LBLs????23??A
510 DATALBLT????2D??A,LBMI????2B??A,LBN
E????26??A,LBPL????2A??A,LBRA????16??,L
BRN????21??A
515 DATALBSR????17??,LBVC????28??A,LBVS
????29??A
520 DATALDA 8696B6A6,LDB C6D6F6E6,LDD C
CDCFCEC,LDS CEDEFEEEE
525 DATALDU CEDEFEEE,LDX 8E9EBEAE,LDY 8
E9EBEAE,LEAS?????32
530 DATALEAU?????33,LEAX?????30,LEAY?
?????31,LSL ??087868,LSLA48,LSLB58,LSR
??047464,LSRA44,LSRB54,MUL 3D,NEG ??007
060
535 DATANEGA40,NEGB50,NOP 12,ORA 8A9ABA
AA,ORB CADAFAEA,ORCC1A,PSHS34,PSHU36,PU
LS35,PULU37
540 DATAROL ??097969,ROLA49,ROLB59,ROR
??067666,RORA46,RORB56,RTI 3B,RTS 39,SB
CA8292B2A2
545 DATASBCBC2D2F2E2,SEX 1D,STA ??97B7A
7,STB ??D7F7E7,STD ??DDFDED,STS ??DFFFE
FA,STU ??DFFFEF
550 DATASTX ??9FBFAF,STY ??9FBFAFA,SUBA
8090B0A0,SUBBC0D0F0E0,SUBD8393B3A3,SWI
3F,SWI23FA,SWI33FB
555 DATASYNC13,TFR 1F??????,TST ??0D7D6
D,TSTA4D,TSTB5D

```

ACCEL3

ACCEL3
\$99.95

...
YOU OWE IT TO YOUR BASIC PROGRAM

BASIC Compiler, Model I/III, all DOS

ACCEL2 Plus:

- Bigger optimized subset
- Quicker compilation
- More compact output
- Almost total compatibility

developed in England
by Southern Software

ALGORIX
Allen Gelder Software
(415) 387-3131
Box 11721 San Francisco CA 94101

- ① Includes INP, OUT, multi-dimensional arrays.
- ② About 40 lines/second.
- ③ Only 10% -35% code growth.
- ④ Even unstructured for-next loops, variable-bound arrays.

\$99.95 +\$2 Shipping
CA add 6 %



ALGORIX

Allen Gelder Software

(415) 387-3131

20

Box 11721 San Francisco CA 94101



Also **EDIT** Full screen BASIC editor. **\$40**


```

560 REM IND/IND?
565 II=0:CP=0
570 IF ASC(O$)=91 THEN II=1:LO=LO-2:O$=
MID$(O$,2,LO)
575 FOR Q=1 TO LO
580 Q$=MID$(O$,Q,1)
585 IF Q$="," THEN CP=Q:RETURN
590 NEXT Q:RETURN
595 REM PREBYTE
600 PR$="":IF LT/2=INT(LT/2) THEN RETUR
N
605 PR$="10":IF RIGHT$(T$,1)="B" THEN P
R$="11"
610 LT=LT-1:T$=LEFT$(T$,LT):RETURN
620 FOR K=1 TO N-1
625 PRINTK;TAB(5)L$(K)TAB(11)HEX$(AD(K)
);TAB(17)OC$(K):NEXT:RETURN
630 F$=LEFT$(M$,1):F2$=LEFT$(M$,2)
635 IF F2$="LB" THEN680
640 IF F2$="BI" OR F$<>"B" THEN RETURN
645 GOSUB725
650 BV=AD(I)+2:BV=VAL("&H"+Q$)-BV
655 IF BV<0 THEN BV=256+Bv
660 IF BV<0 OR BV>255 THEN BV=0:GOSUB90
0
665 H$=HEX$(BV):IF LEN(H$)=1 THEN H$="0
"+H$
670 OC$(I)=LEFT$(OC$(I),2)+H$
675 RETURN
680 LC=LEN(OC$(I)):LC=LC-4
685 OC$(I)=LEFT$(OC$(I),LC)
690 GOSUB725
695 WV=AD(I)+4:WV=VAL("&H"+Q$)-WV
700 IF WV<0 THEN WV=65536+WV
705 IF WV<0 OR WV>65535 THEN440
710 H$=HEX$(WV)
715 IF LEN(H$)<4 THEN H$="0"+H$:GOTO715
720 OC$(I)=OC$(I)+H$:RETURN
725 O=ASC(O$):IF O<71 OR O>90 THEN Q$=O
$:RETURN
730 Q$="0000"
735 FOR Q=1 TO N-1
740 IF O$=L$(Q) THEN 750
745 NEXTQ:GOSUB900:RETURN
750 IF Q>I THEN PRINT"FORWARD"
755 Q$=HEX$(AD(Q))
760 IF LEN(Q$)<4 THEN Q$="0"+Q$:GOTO 76
0
765 RETURN
770 FORI=1TO N-1
775 O$=OC$(I):L=LEN(O$)
780 IF L=0 THEN 810
785 A=AD(I)
790 FOR Q=1 TO L-1 STEP 2
795 V=VAL("&H"+MID$(O$,Q,2))
800 POKE A,V:PRINTHEX$(A);" ";HEX$(V);"
";:A=A+1

```

```

805 NEXT Q
810 NEXT I
815 O$=O$(N):GOSUB725:PRINT
820 DEFUSR1=VAL("&H"+Q$):RETURN
825 R1$=LEFT$(O$,1):R2$=RIGHT$(O$,1)
830 FORQ=1TO10
835 Q$=MID$(R$,Q,1):NC$=MID$(N$,Q,1)
840 IF R1$=Q$ THEN N1$=NC$
845 IF R2$=Q$ THEN N2$=NC$
850 NEXT Q
855 O$="1E":IF M$="TFR" THEN O$="1F"
860 OC$(I)=O$+N1$+N2$:GOTO435
865 BV=0:FOR Q=1 TO LO STEP 2
870 Q$=MID$(O$,Q,1)
875 EP=INSTR(S$,Q$):IF EP=0 THEN 885
880 BV=Bv+2^(EP-1)
885 NEXT Q
890 H$=HEX$(BV):IF LEN(H$)=1 THEN H$="0
"+H$
895 OC$(I)=RIGHT$(T$,2)+H$:GOTO435
900 PRINT"ERR LINE" I:RETURN
910 INPUT" L S";X$
915 IF X$="S" THEN950
920 IFX$<>"L" THEN980
925 GOSUB985
930 OPEN "I",#-1,"CODES"
932 INPUT#-1,N
934 FOR I=1 TO N
937 INPUT#-1,L$(I),M$(I),O$(I)
940 NEXTI:GOSUB155:GOTO980
950 GOSUB985
955 OPEN "O",#-1,"CODES"
960 PRINT#-1,N
965 FORI=1 TO N
970 PRINT #-1,L$(I),M$(I),O$(I)
975 NEXTI
980 PRINT"OK":CLOSE#-1:GOTO20
985 INPUT"READY TAPE";Q$:RETURN

```

The Color Computer Disassembler

In trying to learn about the 6809E, it is convenient to have available a disassembler, which is simply a program for converting machine code in memory to an assembly language listing. The disassembler presented here is written in Extended Color BASIC and runs in just over 6K. The mnemonics and operands are mostly standard, but there are a few exceptions. The instruction ANDCC is changed to ANDC in order to match the three or four-character length of the other mnemonics. The CC (condition code) register is also referred to as C when present as an operand in push, pull, transfer and exchange instructions. The other nonstandard output is also in connection with push and pull instructions. The presence of the up-arrow character in the operand field of one of these instructions refers to the stack pointer for the stack not involved in the mnemonic. Thus, for example, PULS ↑

Freedom Technology International

ANNOUNCES

BigScreen

80 X 24 Video Display for your TRS-80

From the company that brought you
CP/M Compatibility Plus 64K RAM

Freedom Option

CP/M Compatibility for your
TRS-80 Model I and III, PMC 80
and 81, and LNW 80 systems.

Freedom Plus

CP/M Compatibility Plus
64K RAM for your TRS-80
Model I and III.

TWO SYSTEMS IN ONE

Run CP/M application
programs in addition to
TRSDOS

INDUSTRY STANDARD

Enter the world of powerful
CP/M application programs;
WordStar, dBase II, etc.

OPEN AND SHUT CASE

EASY to install, plug-in
boards; no wires or traces to
cut; no soldering.

TECHNICAL BACKGROUND

Over 50 years of high
technology experience...from
Maxi's to Micro's...both
Hardware and Software.

FREEDOM OF CHOICE

T8/OS (our powerful Z-80
code operating system) and
CP/M 2.2 if you choose.

- Dealer Inquiries Invited
- Six Month Warranty
- 30 Day Money Back
Guarantee

MANUAL\$25.00

Call us for information about
our large selection of CP/M
application programs.

SEE YOUR LOCAL
DEALER OR CALL
TOLL FREE

1-800-523-4067

In Pennsylvania call
(215) 569-2381

TRS-80 is a registered trademark of
Tandy Corp.
LNW-80 is a registered trademark of
LNW Research Corporation
PMC 80,81 is a registered trademark of
Personal Microcomputer Inc.
TRSDOS is a registered trademark of
Tandy Corp.
CP/M is a registered trademark of Digital
Research Inc.
WordStar is a registered trademark of
MicroPro Int. Corp.
dBase II is a registered trademark of
Ashton-Tate

Freedom Technology International

119 North 18th Street, Philadelphia, PA 19103

To use the disassembler itself, simply type RUN and respond to the address request in decimal or hex. If hex is used, include the characters "&H" ahead of the desired value. Thus "&H600" or "1536" could be used here with the same effect. When POKEing code into memory, the same choice is available. The locations &H600 to &HBFF are not used by BASIC except for hires graphics, and thus provide a handy place for user routines. Color BASIC and Extended Color BASIC ROMs are located to begin at &H8000 and &HA000, respectively.

```

10 PCLEAR1:RK$="CABDXY^P"
20 DIMK$(15):FORI=0TO15:READX$(I):NEXT:
REM TFR,EXC
30 DATAD,X,Y,U,S,PC,-,-,A,B,C,DP,-,-,-,
-
40 DIM R$(3)
50 FOR I=0 TO 3:READR$(I):NEXT
60 DATA X,Y,U,S
70 DIM M$(15,15):REM MNEUMONICS
80 FOR I=0 TO 15:FORJ=0TO15
90 READ M$(I,J):NEXT:NEXT
100 DATANEG 2,-,-,COM 2,LSR 2,-,ROR 2,A
SR 2,ASL 2,ROL 2,DEC 2,-,INC 2,TST 2,JM
P 2,CLR 2
101 DATA-,-,NOP 1,SYNCL,-,-,LBRA8,LBSR8
,-,DAA 1,ORCC4,-,ANDC4,SEX 1,EXG 5,TFR
5
102 DATABRA 3,BRN 3,BHI 3,BLS 3,BCC 3,B
CS 3,BNE 3,BEQ 3,BVC 3,BVS 3,BPL 3,BMI
3,BGE 3,BLT 3,BGT 3,BLE 3

```

44 80-U.S. Journal


```

203 DATA-,"[ ,R++]",-,"[ ,--R]", "[ ,R]", "[
B,R]", "[A,R]",-,"[ **,R]", "[####,R]",-,"
[D,R]", "[ **,PC]", "[####,PC]",-,"[####]
300 GOTO 500
310 INPUT"ENTER ADDRESS";M
320 INPUTB$:IF B$="END"THEN END
330 POKE M,VAL(B$)
340 M=M+1:GOTO 320
500 INPUT"ENTER ADDRESS";M
510 H$=HEX$(PEEK(M)):IFLEN(H$)=1THENH$=
"0"+H$
520 SM=M
530 I=VAL("&H"+LEFT$(H$,1))
540 J=VAL("&H"+RIGHT$(H$,1))
550 IF I=1 AND J<2 THEN 2140
560 REM 2-BYTE OPCODE ^
570 S$=M$(I,J):IF S$="-"THENS$="----":O
$=CHR$(39)+CHR$(16*I+J)+CHR$(39):GOTO62
0:'PHONEY OPCODE
580 S$=LEFT$(S$,5)
590 AT=VAL(RIGHT$(S$,1))
600 ON AT GOTO 1100,1200,1300,1400,1500
,1600,1700,1800,1900
610 ' INHERENT,DPAGE,REL,IMMED,REG, LONG
IMMED,EXTD, LONG REL, POST
620 S$=LEFT$(S$,4)+" "+O$
630 O$=""
635 T$=HEX$(SM)
637 IF LEN(T$)<4 THEN T$="0"+T$:GOTO 63
7
640 T$=T$+" "
650 FORI=SM TO M:V$=HEX$(PEEK(I)):IF LE
N(V$)=1 THEN V$="0"+V$
660 T$=T$+V$:NEXT I
670 PRINT:PRINTT$;TAB(15)S$;
680 M=M+1
690 GOTO510:' NEXT INSTRUCTION
790 REM PEEK(M) TO HEX & BUMP M
800 M=M+1:V$=HEX$(PEEK(M)):IF LEN(V$)=1
THEN V$="0"+V$
810 RETURN
1100 O$="":GOTO620
1200 GOSUB800:O$=V$:GOTO620
1300 M=M+1:V=PEEK(M):IFV>127 THEN V=V-2
56
1310 V=M+1+V:O$=HEX$(V)
1320 IFLEN(O$)<4 THEN O$="0"+O$:GOTO 13
20
1330 GOTO620
1400 GOSUB800:O$="#"+V$
1410 IF ASC(S$)<>80 THEN 620
1420 N=VAL("&H"+V$):O$=""
1430 FOR I=0TO7:'PUSH-PUL DECODE
1440 IF (N AND (2^I))>0 THEN O$=O$+"",+
MID$(RK$,I+1,1):IF RIGHT$(O$,1)="D" THE
N O$=O$+"P"

```

```

1450 NEXT I
1460 O$=MID$(O$,2):GOTO 620
1500 GOSUB800:R1=VAL("&H"+LEFT$(V$,1)):
R2=VAL("&H"+RIGHT$(V$,1)):O$=X$(R1)+", "
+X$(R2):GOTO620
1600 GOSUB800:O$="#"+V$:GOSUB300:O$=O$+
V$:GOTO620
1700 GOSUB800:O$=V$:GOSUB800:O$=O$+V$:G
OTO620
1800 GOSUB800:O$=V$:GOSUB800:O$=O$+V$
1810 V=VAL("&H"+O$)
1820 IF V>32767 THEN V=V-65536
1825 V=M+1+V
1830 IF V<0 THEN O$="----" ELSE O$=HEX$(
V)
1840 GOTO 620
1900 GOSUB800:REM GET POSTBYTE
1910 N1=VAL("&H"+LEFT$(V$,1))
1920 N2=VAL("&H"+RIGHT$(V$,1))
1930 R=N1 AND 6:R=R/2:R$=R$(R)
1940 I=2*INT(N1/8)+(N1 AND 1)
1950 J=N2:O$=P$(I,J)
1960 L=LEN(O$)
1970 FOR I=1 TO L
1980 IF MID$(O$,I,1)="R" THEN 2010
1990 NEXT I
2000 GOTO 2020
2010 MID$(O$,I,1)=R$: 'REGISTER
2020 FORI=1TOL
2030 IF MID$(O$,I,1)="*" THEN2070
2040 IF MID$(O$,I,1)="#" THEN 2100
2050 NEXT I
2060 GOTO 2130
2070 GOSUB800
2080 MID$(O$,I,2)=V$
2090 GOTO 2130
2100 GOSUB800:T$=V$:GOSUB800
2110 T$=T$+V$
2120 MID$(O$,I,4)=T$
2130 GOTO 620
2140 GOSUB800:' 2-BYTE OPCODE
2150 IFLEFT$(V$,1)<>"2"THEN2210
2160 L1=2:' LONG BRANCH
2170 L2=VAL("&H"+RIGHT$(V$,1))
2180 T$=M$(L1,L2)
2190 S$="L"+LEFT$(T$,3)+RIGHT$(T$,1)
2200 GOTO 590
2210 P=6+5*J
2220 L1=VAL("&H"+LEFT$(V$,1))
2230 L2=VAL("&H"+RIGHT$(V$,1))
2240 T$=M$(L1,L2)
2250 S$=MID$(T$,P,5)
2260 IF LEN(S$)=0 THENS$="----":O$="---
-":GOTO620:' BYTE 2 FUNNY
2270 GOTO590

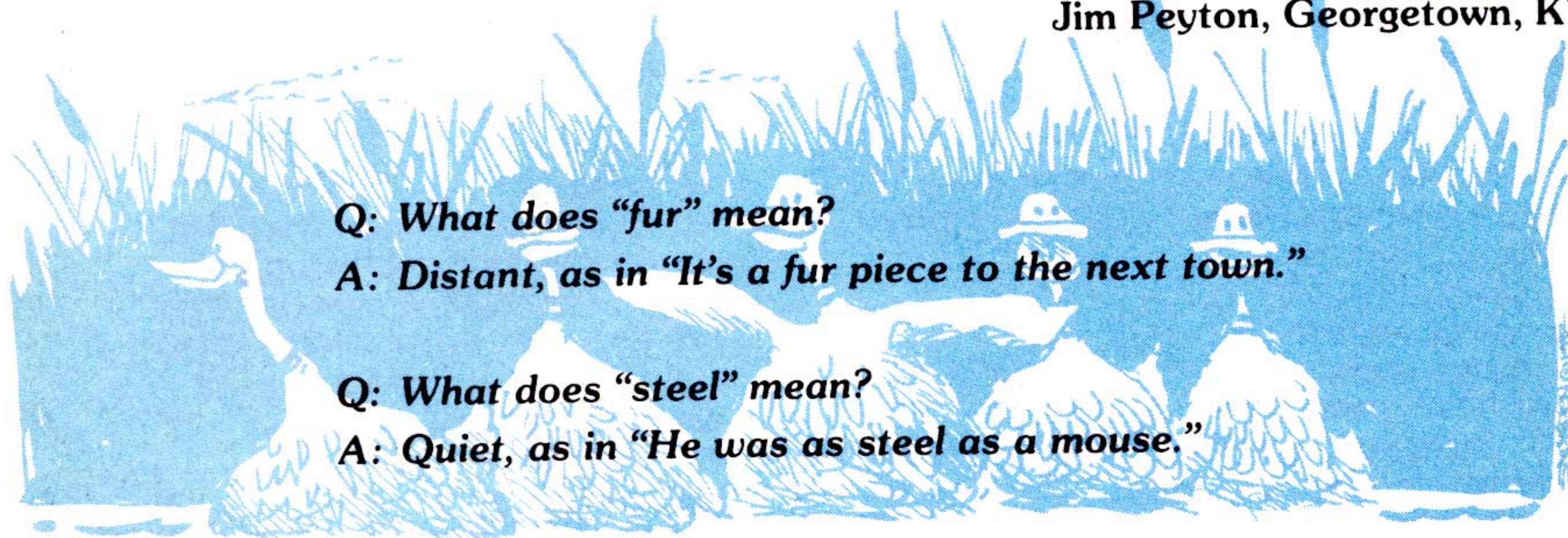
```


Whiz quiz . . .

or, do you speak Southern Country?

Model I/III, 16K tape or disk

Jim Peyton, Georgetown, KY



WHIZ QUIZ is an animated graphics program that administers almost any multiple choice quiz. It employs the basic learning principles of immediate feedback and positive reinforcement. When a question is answered correctly, two ducks respond with excitement and approval. If the answer is a poor choice, the ducks so indicate and present the user with an explanation of the correct or best answer.

Questions are presented in a different order each time the program is run. This allows the quiz to be administered to the same person several times, or until mastery is achieved, without generating a response pattern.

When a question is answered correctly, two ducks respond with excitement and approval.

A short quiz, "Do You Speak Southern Country?", is included in the program for demonstration purposes. Replace it with a quiz of your own choosing.

Here is a line analysis of the program:

Lines 10-20 perform initialization and housekeeping chores.

Lines 30-40 ask the user to wait while the program reads the graphic data for the ducks into strings.

Line 100 prints the quiz title in the top center of the screen.

Line 110 prints the ducks on either side of the screen.

Line 120 selects a question-and-answer set using the randomized index and POKEs the address of the set into the data pointers.

Line 130 reads the question-and-answer set and checks for end-of-data.

Line 140 absorbs any unwanted input from the keyboard and adds arrows to the string which holds the question.

Line 150 erases the portion of the screen which holds the answer choices.

Line 160 sets up an INKEY\$ input.

Line 170 selects at random a movement for the left duck.

Line 180 does the same for the right duck.

Line 190 prints the question centered in the upper part of the screen.

Lines 200-210 number and print the answer choices.

Line 220 waits a bit, then prompts the user to type in his answer.

Line 230 prints a question mark in the space to contain the response. If no response is immediately forthcoming, the program loops back to line 160 and processes the block again, animating the ducks with random movements. If the keyboard scan does find a response, the response is tested and, if valid, it is printed.

Line 240 compares the response to the correct answer. If a match is found, the variable holding the number of correct responses is incremented and the program goes to the wing-flap and head-nod routine. A mismatch increments the incorrect response variable and sends the program to the head-shake and explanation-crawl routine.

M-ZAL™

Release Two Is Here!

Our Users asked for it, and we made the best TRS-80 disk assembler even better! Now M-ZAL has:

- Recursive MACROS with full symbolic parameter substitution
- Conditional assembly with unlimited nesting
- Text Editor warm-start/recovery option
- Support for all popular source file formats
- Load Module inspect/superzap using LINKER

and the features that made it famous:

- True multi-pass assembly
- Full Screen Option Menus
- ENTRY/EXTERN symbols, relocation, and object module linking
- 8 character labels with sorted symbol table
- Built-in symbol table cross-reference
- Nested *INCLUDES (source file chaining/nesting)
- Lower case support (Model 3 only)
- Over 175 pages of documentation including Z-80 Technical Manual
- Full Screen Text Editing and much, much more!

M-ZAL provides a modular, structured development environment that makes programming your TRS-80 a truly enjoyable experience. Order yours today. (Requires 32k, 2 disk system)

#1050-10	Mod 1	\$149.00
#1250-10	Mod 3	\$149.00

CAU Development Software— The Professionals Choice:

Full Screen Text Editor for BASIC: we were the first to give the TRS-80 this indispensable ability! A must for every BASIC programmer:

#1010-20	Mod 1	\$24.95
#1210-20	Mod 3	\$29.95

T-ZAL: custom designed for the Model 3, this tape based assembler has many of M-ZAL's most desired features.

#1250-20	Mod 3 only	\$49.95
----------	------------	---------

XBUG: for machine language analysis and debugging—this tiny (2.5k) but powerful program lets you do it all!

#1020-10	Mod 1	\$19.95
#1220-10	Mod 3	\$19.95

FILXFER: transfer any disk file between two TRS-80s. Use direct cable link or RS modems. Mod 1 and Mod 3 can be mixed. RS-232 and disk reqd.

#1040-10	Mod 1 and 3	\$49.95
----------	-------------	---------

"We've been using M-ZAL heavily for over two months now, and it's been worth its weight in gold."

—Chuck Tesler
PROSOFT

"...well written software that is long overdue."

—Bruce Douglass
80 Microcomputing
BASIC Editor Review

"During the first 3 days of use, M-ZAL saved more money in programmers time than we had paid for the product."

—William Denman
Author of Asylum
MED SYSTEMS

"The editor has at least doubled my productive capacity...Having spent a good deal of money on so called 'utilities' that don't work, it's a delight to find one that not only lives up to its claims but surpasses the advertising."

—BASIC Editor user

Our choice for the best TRS-80 DOS:

DOSPLUS 3.4	Mod 1	\$149.00
DOSPLUS 3.4	Mod 3	\$149.00

Call or write for more information.

All products require level II.

Mail orders specify catalog #.

Send check, money order, or MC/VISA numbers and expiration date to:

Computer Applications Unlimited

P.O. Box 214, Dept. ABO Rye, New York 10580
(914) 937 6286

N.Y. State residents add applicable sales tax.
Outside USA and Canada add \$7.00 shipping.
Dealer Inquiries Invited.



CAU **COMPUTER APPLICATIONS UNLIMITED™**
a div. of CAU, Inc.

TRS-80 is a TM of Tandy Corp. M-ZAL is a TM of CAU, Inc.
Z-80 is a TM of Zilog, Inc.

Line 250 calculates and prints a percentage score.

Line 260 closes the loop and begins the cycle for the next question.

Lines 300-510 read the graphic data into strings.

Lines 520-570 create strings containing line feeds and back spaces needed in constructing the figures.

Lines 580-690 concatenate the strings into figures and parts of figures.

Lines 700-720 read through the quiz data, saving the addresses of each question-and-answer set.

Lines 730-780 create a randomized index by first generating a series of random numbers and an ordered index and then sorting the random series with the index tagging along.

Lines 1000-1510 are subroutines used to animate the ducks.

Lines 2000-2140 are DATA statements containing the ASCII numbers for the graphic blocks needed to create the ducks.

Lines 3000-3210 contain the data for the sample quiz.

In substituting your own quiz, it is essential that the items be in the following sequence: (1) Title, (2) Question, (3-6) Choices, (7) The number of the correct answer, (8) Explanation. Now, repeat the series starting at (2).

It is necessary that the explanation string have a trailing blank. It is also required that the last DATA statement contains six commas, since the program uses these as an end-of-data marker.

The listing for WHIZ QUIZ contains several REM statements. Omitting these will save typing and memory and allow the program to operate more efficiently. Only the lines ending in zero need be preserved.

Program Listing for WHIZ QUIZ

```

1  '=====  W H I Z   Q U I Z  ====
2  '
3  '          BY JIM PEYTON
4  '          ROUTE 2
5  '          GEORGETOWN KY 40324
6  '
7  ' =====
8  '  INITIALIZE
9  ' =====
10 CLS: CLEAR 1100: RANDOM: DEFSTRB-H
20 DEFINTI-Z: DIMA(50), R(50,2), T(50)
30 PRINT@469, "PLEASE WAIT A MOMENT
40 GOTO300
96 '
97 ' =====
98 '  MAIN PROGRAM
99 ' =====
100 CLS: S=0: T=0: PRINT@31-(LEN(X$)/2), X$
110 FORJ=1TOI: P=519: Q=568: GOSUB1000: GOS
UB1010
120 POKE16639, R(A(J), 1): POKE16640, R(A(J)
), 2)

```

```

130 READ I$, J$, K$, L$, M$, N$, O$: IF I$=" " TH
EN270
140 Y$=INKEY$: I$="====>  "+I$+"  <===="
150 PRINT@128, CHR$(30);: PRINT@256, CHR$(
30);: PRINT@320, CHR$(30);
160 Z$="": Z$=INKEY$
170 A=RND(9): ON A GOSUB1160, 1180, 1200, 1
220, 1240, 1260, 1300, 1320, 1350
180 A=RND(9): ON A GOSUB1170, 1190, 1210, 1
230, 1250, 1270, 1310, 1330, 1370
190 PRINT@159-(LEN(I$)/2), I$
200 PRINT@261, "<1>  "J$;: PRINT@292, "<3>
" L$;
210 PRINT@325, "<2>  "K$;: PRINT@356, "<4>
" M$
220 GOSUB1510: PRINT@464, "TYPE THE NUMBE
R OF YOUR CHOICE
230 PRINT@606, "?";: IF Z$=>"1" AND Z$<="4" T
HEN PRINT@606, Z$; ELSE 160
240 IF Z$=N$ THEN S=S+1: GOSUB1450 ELSE T=T+1
: GOSUB1470
250 PRINT@921, "SCORE =" ; INT( (S/(S+T)) *1
00);
260 NEXTJ
270 END
296 '
297 ' =====
298 '  READ DATA INTO STRINGS
299 ' =====
300 READA1: FORI=1TOA1: READA: B0=B0+CHR$(
A): NEXT
310 FORI=1TOA1: READA: B1=B1+CHR$(A): NEXT
320 FORI=1TOA1: READA: B2=B2+CHR$(A): NEXT
330 FORI=1TOA1: READA: B3=B3+CHR$(A): NEXT
340 READA2: FORI=1TOA2: READA: C0=C0+CHR$(
A): NEXT
350 FORI=1TOA2: READA: C1=C1+CHR$(A): NEXT
360 FORI=1TOA2: READA: C2=C2+CHR$(A): NEXT
370 FORI=1TOA2: READA: C3=C3+CHR$(A): NEXT
380 FORI=1TOA2: READA: C4=C4+CHR$(A): NEXT
390 FORI=1TOA2: READA: C5=C5+CHR$(A): NEXT
400 FORI=1TOA2: READA: C6=C6+CHR$(A): NEXT
410 FORI=1TOA2: READA: D0=D0+CHR$(A): NEXT
420 READA3: FORI=1TOA3: READA: D1=D1+CHR$(
A): NEXT
430 READA4: FORI=1TOA4: READA: E0=E0+CHR$(
A): NEXT
440 FORI=1TOA4: READA: E1=E1+CHR$(A): NEXT
450 FORI=1TOA4: READA: E2=E2+CHR$(A): NEXT
460 FORI=1TOA4: READA: E3=E3+CHR$(A): NEXT
470 FORI=1TOA4: READA: F0=F0+CHR$(A): NEXT
480 FORI=1TOA4-1: READA: F1=F1+CHR$(A): NE
XT
490 FORI=1TOA4: READA: F2=F2+CHR$(A): NEXT
500 FORI=1TOA4: READA: F3=F3+CHR$(A): NEXT
510 FORI=1TOA3: READA: F4=F4+CHR$(A): NEXT

```


Quiz

```

516 '
517 '=====
518 ' LINE FEEDS AND BACK SPACES
519 '=====
520 G0=CHR$(26)+STRING$(7,24)
530 G1=CHR$(26)+STRING$(5,24)
540 G2=CHR$(26)+STRING$(6,24)
550 G3=CHR$(26)+STRING$(9,24)
560 G4=CHR$(26)+STRING$(10,24)
570 G5=CHR$(26)+STRING$(13,24)
576 '
577 '=====
578 ' CUMULATE STRINGS INTO FIGURE
579 '=====
580 HA=B1+G1+C0+G0+D0+G4+E0+G5+F0+G3+F4
590 HB=B1+G1+C0+G0+D0+G0+D0+G4+E0+G5+F0
+G3+F4
600 HC=B1+G1+C1+G0+D0
610 HD=B1+G1+C2+G0+D0
620 HE=B2+G1+C3+G0+D0
630 HF=B3+G1+C4+G0+D0
640 HG=B0+G1+C5+G2+D1
650 HH=B1+G1+C6+G0+D0
660 HI=E0+G5+F0+G3+F4
670 HJ=E1+G5+F1
680 HK=E2+G5+F2
690 HL=E3+G5+F3
696 '
697 '=====
698 ' SAVE DATA POINTERS
699 '=====
700 I=0:READX$:I=I+1:R(I,1)=PEEK(16639)
:R(I,2)=PEEK(16640)
710 READI$,J$,K$,L$,M$,N$,O$:IFI$="THE
NI=I-1:GOTO730
720 I=I+1:R(I,1)=PEEK(16639):R(I,2)=PEE
K(16640):GOTO710
726 '
727 '=====
728 ' RANDOM INDEX FOR POINTERS
729 '=====
730 FORJ=1TOI:T(J)=RND(999):A(J)=J:NEXT
J
740 FORJ=1TOI:FORK=1TOI-J
750 IFT(K)>T(K+1)THENT=T(K):T(K)=T(K+1)
:T(K+1)=T:A=A(K):A(K)=A(K+1):A(K+1)=A
760 NEXTK
770 NEXTJ
780 GOTO100
996 '
997 '=====
998 ' ANIMATE DUCKS
999 '=====
1000 PRINT@P+63,HA;:RETURN
1010 PRINT@Q+63,HA;:RETURN
1020 PRINT@P-1,HB;:RETURN
1030 PRINT@Q-1,HB;:RETURN

```

DISCOUNT

COMPARE OUR PRICES!

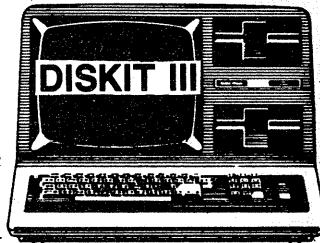
FREE SHIPPING
*on all pre-paid cash orders

DISKIT III™

MODEL III UPGRADE

FEATURES:

- Gold Plated Edge Connectors
- Switching Power Supply (Runs cooler)
- 40/80 Track supported
- Single/Dual Head supported
- Metal Disk Drive Brackets
- All Hardware and Cables for 2 Disk Drive
- 1 Hour or Less for Installation
- 100% Compatible
- No Soldering Needed
- 180 Days Warranty on Controller



DISKIT III
W/Out Drives

\$32900

DISKIT III
W/One Tandon
100 40 Tack Drive

\$54900

DISKIT III
W/Two Tandon
Disk Drives

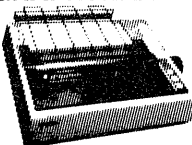
\$76400

DEALER INQUIRIES WELCOME

EPSON

NEW LOWER PRICES! WITH GRAPHTRAX

MX-80
\$459.00
MX-80 F/T
\$559.00
MX-100
\$729.00



THE NEW MICROBUFFER® ACCEPTS DATA AS FAST AS YOUR COMPUTER CAN SEND IT

MBP—16K Parallel \$159.00
MBS— 6K Serial \$159.00
INTERFACE CARDS
8141 (RS-232) \$ 75
8150 (2K Buffered RS-232) \$150
8161 (IEEE 488) \$ 55
8131 (Apple Card) \$ 85
8230 (Apple Cable) \$ 25
8220 (TRS-80 Cable) \$ 25

OKIDATA MICROLINE 82A \$ 549.00
OKIDATA MICROLINE 83A \$ 799.00
OKIDATA MICROLINE 84 \$1199.00

MODEL I complete MODEL III DISK DRIVES

Includes Case, Power Supply
90 Days 100% Warranty

\$28995

BARE DRIVES

TANDON 5 1/4 INCH
100 1 SINGLE HEAD 40 TRK 229.00
100 2 DUAL HEAD 40 TRK 299.00
100 3 SINGLE HEAD 80 TRK 299.00
100 4 DUAL HEAD 80 TRK 429.00

MODEMS

UDS 103 LP DIRECT CONNECT .. 175.00
UDS 103 JLP AUTO ANS 209.00
HAYES MICROMODEM II (APPLE) 299.00
HAYES 100 MODEM (S-100) 325.00
HAYES SMART MODEM (RS-232) 249.00

PARAGON magnetics™ Gold

MTC's
premium Single Sided Soft-Sector
DOUBLE DENSITY, 5" 4-inch diskettes
with reinforcing HUB-RINGS. Individually
100% ERROR free certified. Invest in
GOLD!
PARAGON MAGNETICS GOLD..... \$23.95

MDS DISKETTES™

(DOUBLE-DENSITY) Single-sided soft-
sectored 5 1/4 inch 100% error-free certified.
These diskettes are fully guaranteed for
one year against defects (return any bad
diskettes) and we will replace FREE.

MDS Disk Pak Box of 10 \$21.95
5 Boxes of 10 Disks \$99.95

VERBATIM

Soft-Sector Diskettes

5 1/4" 1S/DDen (MD525-01) \$26.95
5 1/4" 2S/DDen (MD550-01) \$39.95
5 1/4" 2S/4Den (MD557-01) \$51.50
8" 1S/DDen (FD34-8000) \$43.95

Hard-Sector Diskettes

5 1/4" 1S/DDen 10-sector (MD525-10) \$26.95
5 1/4" 2S/DDen 10-sector (MD550-10) \$39.95
5 1/4" 2S/4Den 10-sector (MD557-10) \$51.50

Supplies

HUB RING KIT for 5 1/4" disks \$10.95
HUB RING KIT for 8" disks \$12.95
REFILLS (50 Hub Rings) \$ 5.95
CLEANING KIT for 5 1/4" drives \$24.95
5 1/4-inch diskette case \$ 3.50
8-inch diskette case \$ 3.95
5 1/4-inch File Box for
50 diskettes \$24.95

DISKIT III IS A ® OF MDS

**MOST ORDERS
SHIPPED WITHIN
ONE BUSINESS DAY**
Products damaged in
transit will be
exchanged.

Prices, Specifications
and Offerings subject
to change without
notice.

WE ACCEPT
• VISA
• MASTER CHARGE
• CHECKS
• MONEY ORDERS
• C.O.D.

• Add \$3.00 for shop-
ping & handling
• \$3.00 EXTRA for
C.O.D.
• Ohio residents add
6.5% sales tax



MDS MICRO DATA SUPPLIES
7541 MENTOR AVENUE/#108
MENTOR, OHIO 44080
Call: (216) 951-6502

23


```

1040 PRINT@P-1,HC;:RETURN
1050 PRINT@Q-1,HC;:RETURN
1060 PRINT@P-1,HD;:RETURN
1070 PRINT@Q-1,HD;:RETURN
1080 PRINT@P-1,HE;:GOSUB1020:RETURN
1090 PRINT@Q-1,HE;:GOSUB1020:RETURN
1100 PRINT@P-1,HF;:GOSUB1020:RETURN
1110 PRINT@Q-1,HF;:GOSUB1030:RETURN
1120 PRINT@P-1,HG;:GOSUB1020:RETURN
1130 PRINT@Q-1,HG;:GOSUB1030:RETURN
1140 PRINT@P-1,HH;:GOSUB1350:GOSUB1020:
RETURN
1150 PRINT@Q-1,HH;:GOSUB1370:GOSUB1030:
RETURN
1160 PRINT@P+63,HC;:RETURN
1170 PRINT@Q+63,HC;:RETURN
1180 PRINT@P+63,HD;:RETURN
1190 PRINT@Q+63,HD;:RETURN
1200 PRINT@P+63,HE;:RETURN
1210 PRINT@Q+63,HE;:RETURN
1220 PRINT@P+63,HF;:RETURN
1230 PRINT@Q+63,HF;:RETURN
1240 PRINT@P+63,HG;:PRINT@P+63,HA;:RETU
RN
1250 PRINT@Q+63,HG;:PRINT@Q+63,HA;:RETU
RN
1260 PRINT@P+63,HH;:PRINT@P+63,HA;:RETU
RN
1270 PRINT@Q+63,HH;:PRINT@Q+63,HA;:RETU
RN
1280 PRINT@P+250,HI;:RETURN
1290 PRINT@Q+250,HI;:RETURN
1300 PRINT@P+250,HJ;:GOSUB1490:GOSUB128
0:RETURN
1310 PRINT@Q+250,HJ;:GOSUB1490:GOSUB129
0:RETURN
1320 PRINT@P+250,HK;:GOSUB1280:RETURN
1330 PRINT@Q+250,HK;:GOSUB1290:RETURN
1340 PRINT@Q+250,HK;:RETURN
1350 PRINT@P+250,HL;:GOSUB1280:RETURN
1360 PRINT@P+250,HL;:RETURN
1370 PRINT@Q+250,HL;:GOSUB1290:RETURN
1380 GOSUB1020:PRINT@P," ";:PRINT@P+62,
" ";:PRINT@P+66," ";:GOSUB1000:RETURN
1390 GOSUB1030:PRINT@Q," ";:PRINT@Q+62,
" ";:PRINT@Q+66," ";:GOSUB1010:RETURN
1400 FORI=1TO5:PRINT@P-1,HG;:PRINT@Q-1,
HG;:PRINT@P-1,HB;:PRINT@Q-1,HB;:NEXTI:R
ETURN
1410 FORI=1TO5:PRINT@P+250,HJ;:PRINT@Q+
250,HJ;:PRINT@P+250,HI;:PRINT@Q+250,HI;
:NEXTI:RETURN
1420 FORI=1TO5:PRINT@P-1,HE;:PRINT@Q-1,
HE;:PRINT@P-1,HB;:PRINT@Q-1,HB;:PRINT@P
-1,HF;:PRINT@Q-1,HF;:PRINT@P-1,HB;:PRIN
T@Q-1,HB;:NEXT:RETURN
1430 FORI=1TO5:GOSUB1260:NEXTI:RETURN

```

```

1440 FORI=1TO5:GOSUB1270:NEXTI:RETURN
1450 GOSUB1510:GOSUB1000:GOSUB1010:GOSU
B1020:GOSUB1030:GOSUB1490:GOSUB1060:GOS
UB1050:GOSUB1500
1460 GOSUB1020:GOSUB1030:GOSUB1510:GOSU
B1410:GOSUB1400:GOSUB1510:GOSUB1380:GOS
UB1390:RETURN
1470 GOSUB1510:GOSUB1000:GOSUB1010:GOSU
B1020:GOSUB1030:GOSUB1490:GOSUB1060:GOS
UB1050:GOSUB1500:GOSUB1420:GOSUB1510:GO
SUB1380:GOSUB1390:GOSUB1360:GOSUB1180:G
OSUB1340:GOSUB1510
1480 O$=STRING$(30,32)+O$:FORI=1TOLEN(O
$):PRINT@785,MID$(O$,I,30);:FORR=1TO20:
NEXTR:NEXTI:GOSUB1510:RETURN
1490 FORR=1TO5:NEXTR:RETURN
1500 FORR=1TO300:NEXTR:RETURN
1510 FORR=1TO30:NEXTR:RETURN
1994 '
1995 '=====
1996 ' GRAPHIC DATA
1997 ' NO. OF ITEMS = 185
1998 ' CHECKSUM = 22709
1999 '=====
2000 DATA 3, 32, 32, 32, 32,176, 32,1
60,176, 32, 32,160,144
2010 DATA 7, 32,176,182,191,185,176,
32,176,176,182,191,189
2020 DATA 32, 32, 32, 32,190,191,185,1
76,176,160,184,187,183
2030 DATA 189,144, 32, 32,160,190,187,1
83,180,144, 32,176,158
2040 DATA 191,173,176, 32, 32,176,190,1
91,189,176, 32, 32, 32
2050 DATA 32,191, 32, 32, 32, 5,130,1
31,191,131,129, 13, 32
2060 DATA 32, 32,184,191,189,191,190,1
91,180, 32, 32, 32,139
2070 DATA 175,191,191,191,189,191,190,1
91,191,191,159,135,139
2080 DATA 175,191,191,191,189,191,190,1
91,180, 32, 32, 32, 32
2090 DATA 32, 32,184,191,189,191,190,1
91,191,191,159,135, 32
2100 DATA 32, 32,139,191,191,191,191,1
91,135, 32, 32, 32, 32
2110 DATA 32, 32, 32,139,191,191,191,1
35, 32, 32, 32, 32, 32
2120 DATA 32, 32,139,191,191,191,191,1
35, 32, 32, 32, 32, 32
2130 DATA 32,139,191,191,191,191,135,
32, 32, 32, 32,176,187
2140 DATA 131,183,176
2996 '
2997 '=====
2998 ' DATA FOR QUIZ
2999 '=====

```


3000 DATA DO YOU SPEAK SOUTHERN COUNTRY??

3010 DATA AIR, ATMOSPHERE, MELODY, AURA, A SPAN OF TIME, 4

3020 DATA "... <4> A SPAN OF TIME EQUAL TO 60 MINUTES; AS IN, IT'LL TAKE ABOUT AN AIR TO FINISH THIS JOB ... "

3030 DATA BALL, A FORMAL DANCE, TO BUBBLE WHEN HEATED, A ROUND OBJECT, TO CRY, 2

3040 DATA "... <2> TO BUBBLE WHEN HEATED; AS IN, I'M GONNA BALL ME SOME WATER ... "

3050 DATA CORE, HEART, INNERMOST PART, ESSENTIAL MEANING, AUTOMOBILE, 4

3060 DATA "... <4> AN AUTOMOBILE; AS IN, MY OLD CORE IS DONE QUIT ON ME ... "

3070 DATA FAR, A CONFLAGRATION, DIFFERENT IN QUALITY, REMOTE IN TIME, DISTANT, 1

3080 DATA "... <1> A CONFLAGRATION; AS IN, LARD-A-MIGHTY! THE HOUSE IS ON FIRE! ... "

3090 DATA FUR, TO LEVEL OUT, ANIMAL HAIR, A COAT, DISTANT, 4

3100 DATA "... <4> DISTANT; AS IN, IT'S A FUR PIECE TO THE NEXT TOWN ... "

3110 DATA HEP, AN OUTDATED SLANG WORD, WISE, ASSIST, UP-TO-DATE, 3

3120 DATA "... <3> ASSIST; AS IN, HEP ME MAKE IT THROUGH THE NIGHT ... "

3130 DATA LACK, SIMILAR TO, A DEFICIENCY, NEED, MISSING, 1

3140 DATA "... <1> SIMILAR TO; AS IN, THIS HOUSE LOOKS LACK A TORNADO DONE HIT IT ... "

3150 DATA STEEL, WEAPON, QUIET, HARD METAL, TAKE UNLAWFULLY, 2

3160 DATA "... <2> QUIET; AS IN, HE WAS AS STEEL AS A MOUSE ... "

3170 DATA THANK, EXPRESS GRATITUDE, MEDITATE, HOLD RESPONSIBLE, PRAYER, 2

3180 DATA "... <2> MEDITATE; AS IN, LET ME THANK ON IT FOR AWHILE ... "

3190 DATA WRENCH, A TOOL, TO INJURE, TO TWIST, WASH LIGHTLY, 4

3200 DATA "... <4> TO WASH LIGHTLY; AS IN, I MUST WRENCH OUT MY UNDERWEAR ... "

3210 DATA , , , , , , ,

WE TAPE ... NOW YOU WILL TOO!

WITH CASSETTE ENHANCEMENTS THAT **WORK**

SPEED, RELIABILITY, VERSATILITY

KWICOS: (Mod 1) A programmer's program... for novice or expert. Not just a simple speed-up (2x to 6x keyboard select) but an easy to use operating system that fully supports your cassette recorder. Features: save, load, verify, search, chain-load, catalog, and test-read of both BASIC and machine code programs; passwords, long titles, debounce, self 'backup' feature, and more..... **\$24**

KOS3: (Mod 3) All 'kwicos' features at 2200 baud, plus KWIK set of: clock and date, cassette high/low, I/O routing, etc..... **\$24**

KWIKIT: (mini-system, BASIC programs only) EasyLoad double-speed for Mod 1, 2200 baud for Mod 3. Many 'kwicos' features and upward compatible..... **\$9.50** (add \$2 for debounce)

KWINK: 'SYSTEM' duplicator supreme. Makes stand-alone fast-loading copy of any 'system' pgm (3 min tape in 44 sec!).. **\$12**

KLOAD: Makes stand-alone fast-loading copy of BASIC programs. Does for BASIC programs what 'kwink' does for SYSTEMs... **\$12**

KLOAN: (Model 3 only) Makes standard 500 or 1500 baud copy of any standard 500/1500 baud SYSTEM program..... **\$10**



KWIK SOFTWARE

816 E. Maupin Street
P.O. Box 328
Bolivar, Mo. 65613

24

(417) 326-7154 or (417) 345-7643



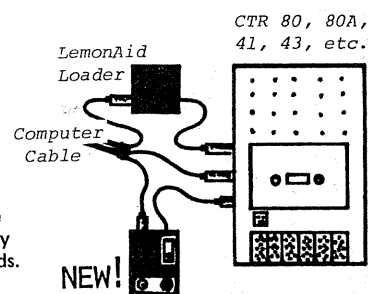
TAKE THE (Model 1) LOADS OFF YOUR MIND!

Plug in a LEMON-AID LOADER...in seconds...End SYSTEM and CLOAD problems for good. PLUS flawlessly load Model 1 programs at 6x speeds using KWIK Software (see ad at left).

Model LL...Original Great Little Loader. **\$12.99**

Model LLQ...Deluxe with handy polarity and bypass switch. Plus volume controlled speaker/earphone jack for automatically monitoring saves/loads.

\$18.99



Use LemonAid and Soft Switch together or use either alone.

NEW! Model LSS...Pushbutton and CPU controlled solid state "soft" switch. Pre-position tape to start of program without danger of "switch hits." Automatic motor-off delay at end of programs moves program past pressure rollers eliminating frustrating "pinch hits!" Protects delicate CPU relay contacts too. Use with all Radio Shack and most other recorders. **\$16.99**

LEMONS TECH SERVICES

325 N. Highway 65 P.O. Box 0429
Buffalo, MO. 65622

24

Call either number any day (until 10 pm) for orders or information. \$1.00 credit on all phone orders. US mail orders postpaid. Add \$3.00 for COD or overseas orders. Missouri residents add 3.125% sales tax. Satisfaction guaranteed on all products!

PDRIVE

A library command for disk compatibility

Model I/III with NEWDOS/80 version 2.0

Sal Navarro, East Rutherford, NJ

Today the question of "What is compatible," is presenting quite a problem to users. It doesn't matter if we are using our system for personal or business use. We still are faced with the problem of compatibility between TRSDOS, LDOS, DOSPLUS and NEWDOS/80 versions 1.0 and 2.0 operating systems. In this article I will tell you one of the ways that NEWDOS/80 version 2 has tried to overcome this with a library command called 'PDRIVE.' I am now using NEWDOS/80 on a 48K Model III with two 40-track and one 80-track disk drives. Below are some PDRIVE setup tables that I've come across in the short time that I've been using it. Before I list the specs for PDRIVE, I should tell you that the reason that you can't read LDOS and DOSPLUS double density disks is that they have strayed from the norm. The norm in the computer industry at present appears to be whatever the programmer or designer decides that it will be at the time that they start their project. Now it would take approximately 5K of program to allow NEWDOS/80 to read their type of directory in double density. While either one will read between a double or single density Model I or Model III of their own type, they are not able to read one of the others. So if you have some disks of DOSPLUS or LDOS and want them on NEWDOS/80, copy them to single density diskettes and then set up the PDRIVE to example 1 in the table below. This will allow NEWDOS/80

to read and copy them onto a NEWDOS/80 system or formatted disk. One thing that may not be clear at first is that you are not limited to two letters in the 'TI' spec of PDRIVE. In the manual it states:

TI = etc., Where TI consists of one or more alphabetic letter flags chosen from, etc.

This means one or more alphabetic letter flags can be used in the 'TI' spec. Even though all the examples consist of one or two you can have *three* if so needed. Example 6 in the manual shows:

PDRIVE, dn1, dn2, TI=AK, TD=E, TC=39, SPT=18, TSR=3, GPL=2, DDSL=17, DDGA=2

This specification is for the Model III for 5-inch disk, 40 tracks, double density, single-sided diskette that has track zero formatted in single density. Now if you change the TI=AK to TI=AL, you have the same specification except that you can read that same 40-track disk in an 80-track drive.

Examples of PDRIVE Tables

Example 1

PDRIVE, 0, 9, TI=A, TC=40, SPT=10, TSR=3, GPL=2, DDSL=17, DDGA=2

This spec will allow you to read LDOS single density disks and

DOSPLUS single density disks that are 40 tracks.

Example 2

PDRIVE, 0, 8, TI=AM, TD=E, TC=40, SPT=18, TSR=3, GPL=6, DDSL=17, DDGA=2

This spec will allow you to copy a file from a Model III TRSDOS disk. You still will not be able to read the directory, as the TRSDOS directory is not compatible with any other system on the market. You can read the TRSDOS 'DIR' in one of two ways: Boot up the TRSDOS diskette and call up the directory, or call up 'SUPERZAP' and enter the drive number from 'DDS' that contains the TRSDOS diskette and relative sector within that drive. This will display the directory while in NEWDOS/80 using the above 'PDRIVE' setup.

Example 3

PDRIVE, 0, 7, TI=AK, TD=E, TC=39, SPT=18, TSR=3, GPL=2, DDSL=17, DDGA=2

This spec tells your Model III that you are using a Model I disk that is double density with track zero in single density.

Example 4

PDRIVE, 0, 6, TI=AL, TD=E, TC=40, SPT=18, TSR=3, GPL=2, DDSL=17, DDGA=2

This is the standard Model III setup except that you can read the 40-track disk in an 80-track drive.

Example 5

PDRIVE, 0, 5, TI=AL, TD=A, TC=40, SPT=10, TSR=3, GPL=2, DDSL=17, DDGA=2

This spec is the same as example 1 except that you can read it in an 80-track drive.

Example 6

PDRIVE, 0, 4, TI=ALM, TD=E, TC=40, SPT=18, TSR=3, GPL=6, DDSL=17, DDGA=2

This one is the same as example 2 except that the disk is read in an 80-track drive.

Example 7

PDRIVE, 0, 3, TI=A, TD=E, TC=80, SPT=18, TSR=3, GPL=2, DDSL=17, DDGA=2

This is a standard setup for the Model III for an 80-track drive.

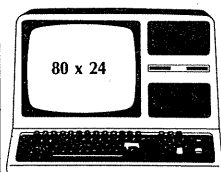
Example 8

PDRIVE, 0, 2, TI=A, TD=E, TC=40, SPT=18, TSR=3, GPL=2, DDSL=17, DDGA=2

This is the 40-track standard setup.

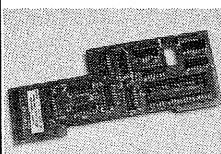
Here's another hint. If you have two drives on your system, set up the 'SYSTEM' options command of 'AL=2.' This will give you the use of the other seven PDRIVE tables as a storage area for the tables that you are likely to be using at different times. If you have three drives, set 'AL=3.' When you need a different drive option, you only type 'PDRIVE, 0, 1=7' and presto, you are ready to go. By resetting the system 'AL' function, you not only gain the extra storage space, but your system need not go looking through the extra drives that you don't have, or look for a file on a drive that doesn't exist. This will even increase your disk I/O time. Not by very much but every little bit helps. Hope these little tidbits help. ■

TRIPLE YOUR COMPUTERS POWER



80 CHARACTER VIDEO DISPLAY

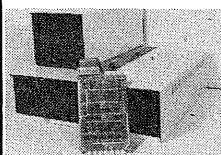
- * 80 x 24 display with upgraded monitor.
- * Simple to install, just plug into a HOLMES EXPANSION MAINFRAME.
- * Model I graphics or Model II reverse video.
- * Basic programs work without modification.
- * Memory mapped - uses empty address spaces in the Model I/PMC or "overlays" keyboard and video in Model I or Model III.



SPEED UP YOUR COMPUTER 2 TO 3 TIMES - ADD A SPRINTER

- * Plugs directly into Z80 socket - no soldering required.
- * Select 2/3 to 3 times normal speed with hardware or software.
- * Automatic switch to normal speed during disk and I/O operation (optional)
- * Trouble free, tested Z80B microprocessor included.
- * TRS 80® Expansion Interface modification available.
- * Versions available for TRS 80® Model I, III, Xerox®, PMC®.

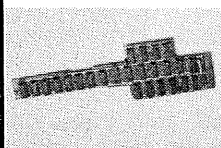
Price **\$99.50**



ADD UP TO 4 DISK DRIVES WITH HOLMES DISK CONTROLLER

- * Any combination of 5¼" or 8" drives.
- * Single or double density.
- * Simple installation - just plug into HOLMES EXPANSION MAINFRAME
- * Printer port included.
- * Compatible with all standard hardware and software.
- * Reliable state-of-the-art LSI data separator.
- * Quality gold plated connectors.
- * DD adapter for the TRS 80® Expansion Interface (E.I.) available.

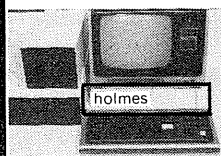
TRS 80® EI Adapter	\$99.50	Single Density	\$148.50
		Double Density	\$219.00



INCREASE INTERNAL MEMORY TO 48K - RELIABLY

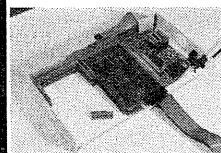
- * Plugs directly into the keyboard unit — No soldering required.
- * Reliable because it does not use an expansion buss to drive the memory system.
- * Power supply loading is not a problem.
- * Only the finest (tested & approved) materials used - each unit tested before shipping.
- * No Expansion Interface needed.
- * Compatible with all HOLMES products.

IM-1	\$ 86.00	32K (Without RAM)	\$66.00
IM-2	\$139.00	48K (Without RAM)	\$99.50



HOLMES EXPANSION MAINFRAME RELIABLE COMPUTER EXPANSION. WHAT YOU WANT — WHEN YOU WANT IT.

Pictured here is Holmes Expansion Mainframe with the DISK CONTROLLER and 80 character modules installed. The keyboard has 48K and speed-up SPRINTER installed. All that is exposed is the "box" and cables.



Look inside the "box". This picture shows the EXPANSION MAINFRAME with only one of the 4 possible modules "plugged in".

- * Has its own power supply. Doesn't compete with the computer for power.
- * Simple plug in modules. You add to the system only as your needs demand.
- * Reliable gold plated connectors.
- * Sturdy metal case suppresses noise.

COMPACT, EFFICIENT, SIMPLE. IT WORKS — AND KEEPS ON WORKING.
Price **\$150.00**

SERVICES:

Complete TRS 80 system update and repair.

OTHER PRODUCTS:

- RS-232 • Extended memory • Self-contained drive/controller • Single module case • Hard disk

One year warranty on all Holmes products.

Terms: VISA, MASTER CHARGE, CASH, COD. Add \$9.00 shipping for the EXPANSION MAINFRAME and \$3.00 for other products in US & Canada. All others add 15%.

Holmes Engineering

3555 SOUTH 3200 WEST
SALT LAKE CITY, UTAH 84119 PHONE 801-967-2324

dealer inquiries invited / prices subject to change without notice



Simple Joe

Accompany your stereo with graphics

Model I

Ron Goodman, North Hollywood, CA

"This is Doctor Demento on KMET Los Angeles. Once again it's Stevens and Grdnic with 'Commercials on 45'." Yes, it was Sunday night in North Hollywood, California, and time for the Doctor Demento show, a special show where weird songs and parodies are played for four hours. While I was sitting there I said, "Boy, wouldn't this be good if it were a live show." The closest though, that I could come to a live show was to draw a face on my TRS-80 screen, and watch. But I wasn't satisfied, and off I went to write the program, Simple Joe.

Simple Joe is a program in which a picture of a man is on your video display. But rather than sitting there like a bunch of dead CHR\$s, he moves his mouth in time with the talking or music that your radio makes. The program is rather short, and the hardware isn't really much at all.

Go over to your stereo. Find the wire coming from one of the two speakers. If you have four speakers, use the primary speakers (sometimes called A speakers or main speakers). Find out what type of plug it is that connects to your stereo system, go to your local electronics store, and buy an equivalent plug. Connect two wires to each terminal of the plug. Make sure the two wires are long enough to reach from the back of your stereo to your computer. I use zip cord to avoid dangling wires, but you

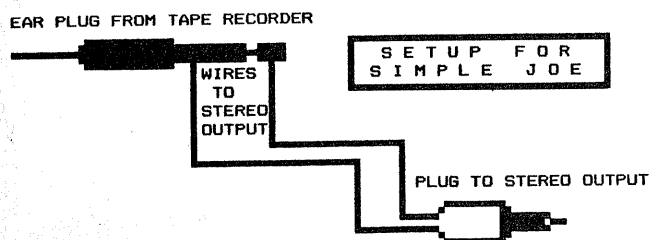
can use separate wire if you wish. The next thing you'll need is a pair of wires with alligator clips at both ends of each of them. Clip an end of one of the wires to either of the wires coming from the stereo plug. Clip the other end to the lower portion of the EAR plug from the TRS-80. Clip one end of the remaining wires to the other wire from the stereo plug. And finally, clip the last alligator clip to the upper portion of the EAR plug.

Now type in the program. When you RUN the program, a stream of numbers will start going up the screen. If your stereo is off, the numbers should all be 127s. Put the stereo plug in the socket that your speaker's plug normally goes to (it doesn't matter which of the two speakers you remove). Turn on your stereo, and tune to a radio station. Turn the volume all the way down. The numbers on the screen now should be 127s. Turn the balance so that it is right in the middle. Slowly start turning the volume up until 255s are printed with the 127s. The best setting will be when there is a fairly even mix between 127s and 255s. If the volume is too high, and the 127 and 255 mix is good, turn the volume down a little and adjust the balance towards the side from which you removed your speaker. When your stereo is at a good volume and the 127 and 255 mix is good, press ENTER. Simple Joe will appear, and assuming you did everything well, he will be talking and singing right along with your radio.

What is going on? Well, the cassette port has the ability to sense sound, just as it does when you are loading a program or data into your computer. Simply, when there is sound, the leftmost bit goes on, and changes the value from 01111111 (127) to 11111111 (255). This program constantly changes the value at the port back to 127, so when INP(255), where 255 is the number for the cassette port, is equal to 255, there must be sound. Hence, Simple Joe's mouth is opened. When INP(255) is 127, Simple Joe closes his mouth.

By storing the values (either 127 or 255) of this port,

Figure 1



there is another possible use for this hardware setup. It might be used for voice or musical recognition. By comparing a list of data to incoming data, it is possible that the incoming data could be recognized as the original. I have done such experiments, and found that when the song I played to my computer was the same, the list was generally between 65% and 85% the same as the incoming data. And when the song was different, the range was between 40% to 60% the same. While this is not extremely accurate, the potential is there for having some remarkable voice/music recognition experiments.

Program Listing for Simple Joe

```
5 REM * BY RON GOODMAN
10 CLS: CLEAR 200: DEFINT A-Z: M=1
20 FORX=0 TO 6: FORY=0 TO 9: READ A: A$(X)=A$(X)
  )+CHR$(A): NEXT Y, X
30 A=INP(255): OUT 255, 0
40 PRINT@25, "SET VOLUME & BALANCE. THE
  N PRESS ENTER";
50 PRINT@960, "VALUE"; A
60 IF INKEY$ <> CHR$(13) THEN 30
70 CLS: A$="* ": A$=A$+A$+A$+A$: A$=LEFT$(
  A$+A$+A$+A$, 31)
80 PRINT CHR$(23); A$: PRINT@960, A$;: A$="*
  "+STRING$(29, 32)+"*"
```

```
90 FORX=64 TO 896 STEP 64: PRINT@X, A$;: NEXT X
100 PRINT@140, "S I M P L E"; CHR$(195); "
  J O E";
110 FORX=0 TO 2: PRINT@22+64*(X+6), A$(X);:
  NEXT X: A=INP(255): IFA=63 THEN M=1 ELSE M=0
120 A=INP(255): OUT 255, 8
130 IFA=63 AND M=1 THEN M=0: PRINT@598, A$(3)
  ;: PRINT@662, A$(4);
140 IFA=191 AND M=0 THEN M=1: FORT=1 TO 50: NEX
  TT: PRINT@598, A$(5);: PRINT@662, A$(6);
150 GOTO 120
10000 DATA 160, 140, 131, 131, 131, 131, 131, 1
  31, 140, 144
10010 DATA 149, 32, 130, 129, 32, 32, 130, 129,
  32, 170
10020 DATA 149, 32, 32, 32, 172, 156, 32, 32, 32
  , 170
10030 DATA 149, 32, 176, 176, 176, 176, 176, 17
  6, 32, 170
10040 DATA 130, 140, 176, 176, 176, 176, 176, 1
  76, 140, 129
10050 DATA 149, 32, 152, 131, 131, 131, 131, 16
  4, 32, 170
10060 DATA 130, 140, 178, 188, 188, 188, 188, 1
  77, 140, 129
20000 CLS: INPUT A: PRINT CHR$(23);: OUT 255,
  A: INPUT X$: GOTO 20000
```



GRAND OPENING SALE

Oasis West

	Reg. Price	Our Price
ADVENTURE INTERNATIONAL		
ELIMINATOR	19.95	15.95
STAR SCOUT	14.95	12.25
ADVENTURES 1-12	ea. 19.95	15.95
BIG 5		
SUPER NOVA	15.95	12.95
ATTACK FORCE	15.95	12.95
ROBOT ATTACK	15.95	12.95
MED SYSTEMS		
DEATHMAZE 5000	14.95	12.25
LABYRINTH	14.95	12.25
ASYLUM	19.95	16.00
COMPU-THINGS		
WIZARD'S MOUNTAIN	14.95	12.00
DARK STAR	24.95	17.50
TOWER OF ORLANDO	19.95	14.50
ROMAN CONQUEST	14.95	12.00
LOGICAL SYSTEMS		
LDOS (mod 1 & III)	129.00	99.00
ACORN SOFTWARE		
INVADERS FROM SPACE	14.95	11.75
SPACE ROCKS	19.95	15.95
ASTRO BALL	19.95	15.95

SPECIAL — SUPER SALE
VAULTS OF CYMARRON
 (100 ROOM GRAPHIC ADVENTURE)
 REG. PRICE 39.95 OUR PRICE 29.95 WITH THIS AD 20.00

AUTOMATED SIMULATIONS		
TEMPLE OF APSHAI	39.95	33.95
HELLFIRE WARRIOR	39.95	33.95
RESCUE AT RIGEL	39.95	33.95
CRUSH CRUMBLE CHOMP	29.95	25.95

CORNSOFT GROUP		
SCARFMAN (DISK MOD 1 & III)	19.95	15.95
SCARFMAN CASS	15.95	13.50

AND MANY MORE
SEND FOR FREE CATALOG / PRICE LIST



470 CASTRO SUITE #207-#3359
 SAN FRANCISCO CA 94114
 415-861-8966

Oasis West

Notes

This month's set of Notes covers a variety of topics. Thanks to many of you for sending in tid-bits and notices.

In March '82, we published a program that enabled you to print graphics on your MX-80 printer. Mr. Henk C. Visser of The Netherlands has gone one better. If you are using NEWDOS/80 version 1.0, change bytes B9 and BA in SYS0/SYS, sector 2 from 3E2E to C620. For NEWDOS/80 version 2.0, change bytes C1 and C2 in SYS3/SYS, sector 4 from 3E2E to C620. For the 2.0 version you will also need to enter under DOS Ready the command SYSTEM 0 AX=127. The changes can easily be made with SUPERZAP under the DFS mode. After the changes are made, both systems will now print graphics and lowercase when JKL is pressed. However, do not use the TRS-80 setting of your MX-80 printer. Obviously, this permanent patch is preferable to having to run the program every time you desire graphics or lowercase. Don't forget to reboot your system before trying the JKL function.

Lemons Tech Services, Buffalo, MO, has notified us that their LemonAid Loader demonstrates marginal performance with the early cassette recorders (Radio Shack CTR-41). They recommend that if your CTR-41 is not working properly with the LemonAid that you replace the recorder with the new CTR-80 or 80A.

Mr. Daniel Schultz, ICM Industries, Carmel, IN, has sent in a marvelous patch for the Model III DEBUG utility. The DEBUG that is supplied on TRSDOS will not operate on memory below 5600H. This three-byte patch will solve the problem:

Under TRSDOS Ready type:

PATCH *5 (ADD=4EDA, FIND=56, CHG=00)

PATCH *5 (ADD=4F00, FIND=56, CHG=00)

PATCH *5 (ADD=5069, FIND=56, CHG=00)

Now your DEBUG utility can display all of memory and alter any part of RAM!

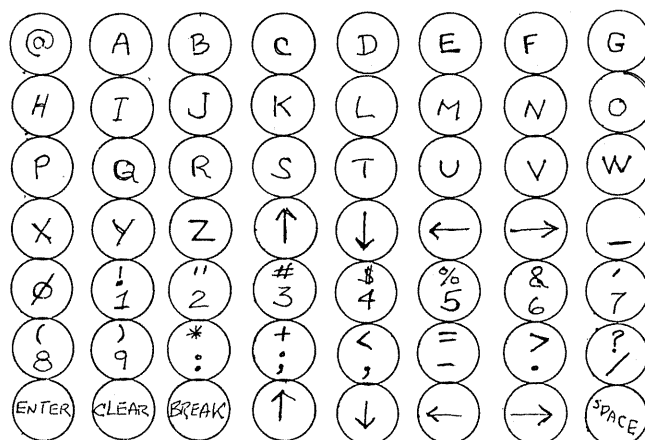
It's the little things that can get to you. In generating listings, we run the programs out on a Model III whenever possible. To fit column width requirements, the FORMS command is used to set the printer. After much tribulation, we tracked down an undocumented bug. The FORMS command prints two extra characters besides those specified in the WIDTH option. So, when requesting a width of 39, be sure to specify only 37. Radio Shack has verified the problems, and according

to them, that is the way it is designed to work. They have put the notice in the latest edition of the owner's manual. Makes us wonder why a patch wasn't offered instead of a "mention four lines from the bottom of page 49 in the new manual."

Mr. Michael L. Phillips, Softronics, Inc., Tulsa, OK, offers a change to our program "Short Leaders for Data Tapes," April '82. For those of you with new ROM releases of the Model I (those that say MEM SIZE?), the following should work. In the assembler listing, change line 440 to read JP NZ,207CH and change line 480 to read JP 2079H. The BASIC listing is altered by changing the values in line 300 from 155 to 124 and from 150 to 121.

As one last piece of information, Mr. Deitmar Goltz of West Germany observed an intriguing characteristic of the Model I. (Model III owners will have trouble with automatic key repeat.) Various technical references have shown the following keyboard matrix:

Figure 1



When depressing two keys at once, you can get unexpected results. By holding down any two keys from the same column (e.g., Q and Y), when you depress a third key it will result in two characters being displayed. If the third key being depressed comes from the same row as the Q, then the extra letter displayed is from the same row as the Y. So, holding down Q and Y and then depressing P will result in an X at the same time. Depressing an S,T,U or V while holding the Q and Y keys will give you arrows. It makes for fun — we leave its worth up to some inventive programmer.

Thanks again for the contributions. Your ingenuity is heartwarming. ■

ACCOUNTING...

*the Language of Business
spoken here!*



SOFTWARE FOR FINANCIAL MANAGEMENT

We make it easy! Plus Accounting Software Packages are menu-driven for easy and confident operation. Our extensive documentation for installation and operation is easy to understand. And, Plus is easy to buy, we are amazingly inexpensive. The Plus technical support package with our 800 number "hot-line" makes it easy to stay up-to-date and informed.

Select a package for a specific application, or get the total system. You can be sure your professionally-designed Plus Accounting Software Package will provide efficient, cost-effective financial management for your most demanding needs. Make a sound business decision today...make your financial control and planning management a Plus. We speak your language.

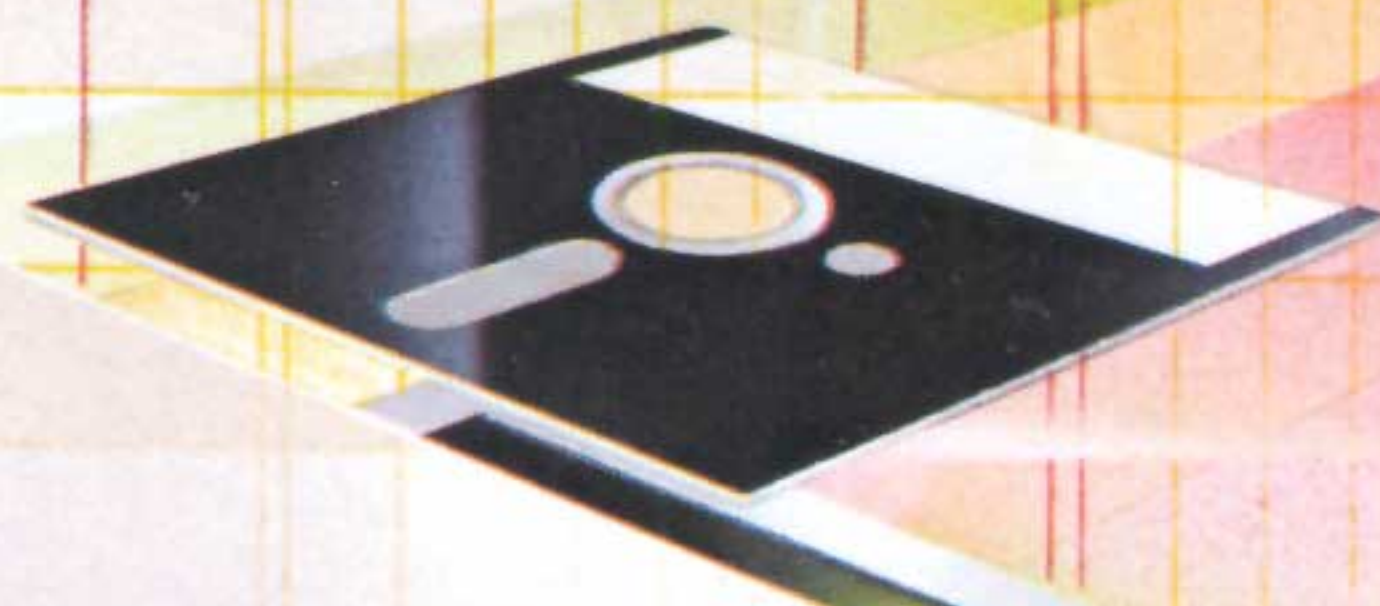
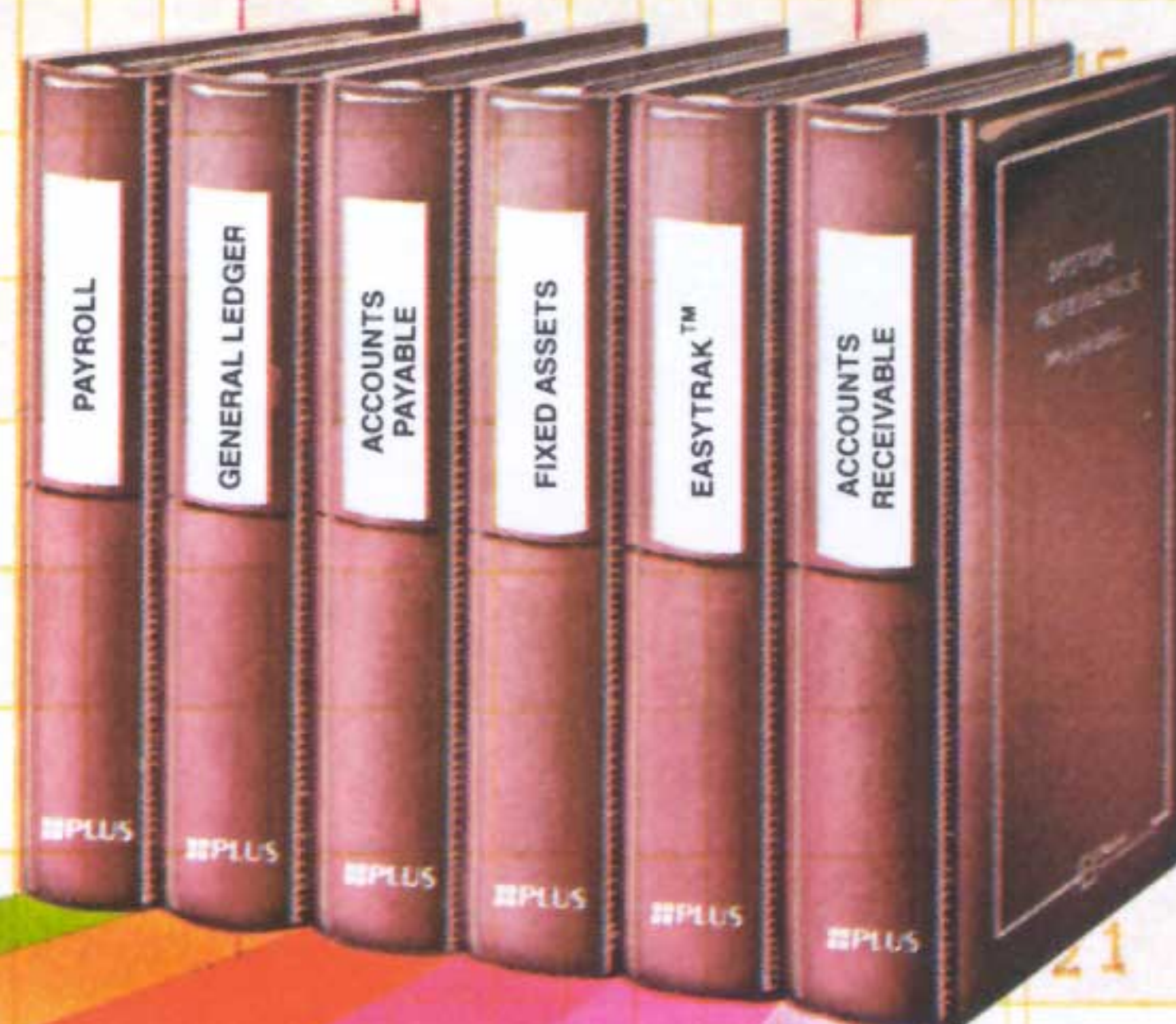
PLUS FINANCIAL AND ACCOUNTING SOFTWARE PACKAGES AVAILABLE:

- GENERAL LEDGER • ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE • FIXED ASSETS
- PAYROLL • EASYTRAK™ ACTIVITY MONITORING SYSTEM

All packages menu-driven. Each accounting package is available "stand alone", or can automatically post to General Ledger. Flexible user-defined file sizes for flexibility. Complete with extensive documentation and thorough installation guide. Furnished on disc.

PLUS PROGRAM AVAILABILITY:

- TANDY MODELS II & III
- THE IBM PERSONAL COMPUTER
- 8" CP/M 2.2 VERSION



PLUS COMPUTER TECHNOLOGY, INC.
6900 North Austin Avenue—Chicago, IL 60648
1-312-647-0988
1-800-323-4240 (Outside Illinois)

WHAT WE DO FOR YOU IS OUR
MOST IMPORTANT PRODUCT.



2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

New Low Prices on Radio Shack TRS-80® Model III Computers!

Whether you own a Model I now, or are thinking about your first computer, take a look at the Model III. You'll find more computing power, more advanced features, more versatility right at your fingertips—and for a lot less money than last year. The reason? We've cut the prices on our disk-based TRS-80 Model IIIs.

The "Extras" Are Built-In. To complement the standard 48K RAM, we add one or two built-in double-density, 40-track 5¹/₄" disk drives—each with 184K of on-line data storage. The 65-key typewriter-style keyboard (with datapad) and 12" high-resolution monitor are built into the handsome, space-saving cabinet. Standard features include upper and lower case, 64-character wide display, repeating keys, real-time clock, parallel printer interface, special graphics characters and screen printing. The RS-232C serial interface (standard with the two-disk version) lets you communicate with other computers by phone—just add a modem.

Power to the Programmer. Our TRSDOS™ Operating System and Disk BASIC language will expand your programming horizons. They're included, along with an owner's manual and comprehensive reference manual. TRSDOS includes DO Files for automatic execution of previously stored commands, FREE space map, and more. Disk BASIC has an extended CMD library that allows you to sort strings, protect from BREAK, cross reference string variables—and more.

Expand Your System. You'll find it easy to add additional disk drives—up to 737K total storage—or a printer, plotter, digitizer, modem and more. And they're all available at a Radio Shack Computer Center, store or participating dealer near you.

New Low Prices on "Add-Ons"!

Upgrade your Model III or I with Radio Shack-supported TRS-80 disk drives—and save \$50 on each! Save \$50 on Model I memory kits, too!

Model III Disk Drive Kit 1. Internal. 40 track, double-density, 184K. Includes TRSDOS and Disk BASIC. Was \$849.00 in RSC-7. 26-1162 799.00*

Disk Drive Kit 2. Internal. Was \$399.00 in RSC-7. 26-1163 349.00*

Disk Drive Kit 3. External. 6¹/₄ × 3¹/₂ × 14¹/₂". U.L. listed. Was \$499.00 in RSC-7. 26-1164 449.00

Disk Drive Kit 4. For Model I or III. External. Was \$499.00 in RSC-7. 26-1161 449.00

Model I 16K RAM Kit. Use with Expansion Interface. Was \$99.00 in RSC-7. 26-1102 49.00*

Model I 16K RAM and Keypad. Was \$180.00 in RSC-7. 26-1101 130.00*

Save
\$146

48K 1-Disk Model III

1849⁰⁰

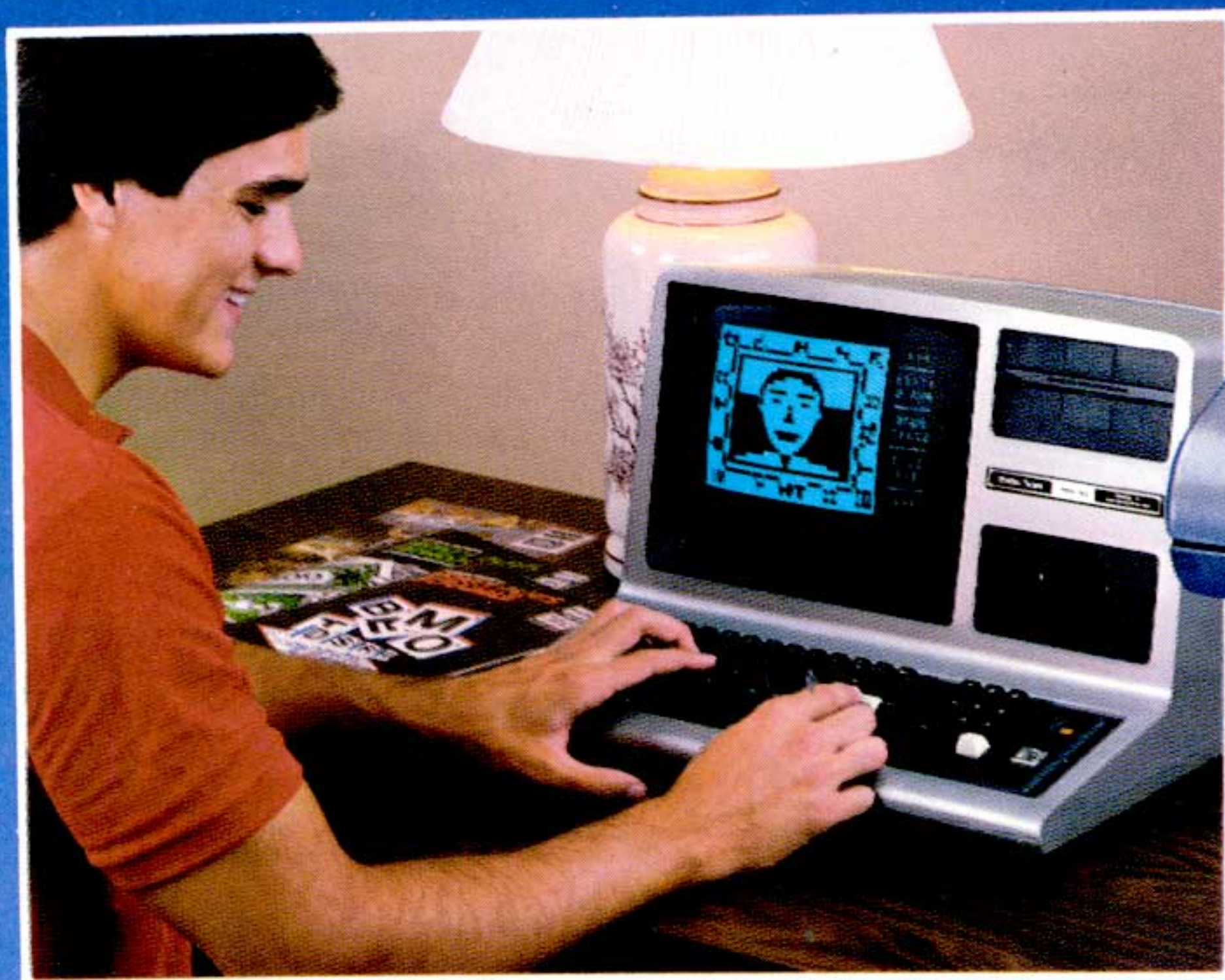
Was \$1995.00
In Catalog RSC-7

Save
\$200

48K 2-Disk Model III

2295⁰⁰

Was \$2495.00
In Catalog RSC-7



Our H
The T

Great New Disk Games!

Zork™. Test your wits and courage in an exciting fantasy world with this adventure game.

For Model III. Requires 32K 1-Disk. 26-1951 39.95

For Model I. Requires 32K 1-Disk, Level II BASIC. 26-1950 39.95

Monty™ Plays Monopoly®. Entertaining, expert opponent. Requires 32K 1-Disk Model III. 26-1952 34.95**

Monty™ Plays Scrabble®. A challenge to Scrabble fans. Requires 32K 1-Disk Model III. 26-1954 34.95**

Model I Double-Density Drive Kit

Backed by Radio Shack. Allows use of double-density disks in current drives. With 35-track drive, storage increases from 84K to 152K; with 40-track, to 184K. Existing Model I software runs "as is" in single-density mode. 26-1143 149.95*

00
SC-7

5.00
RSC-7



Our Hardware, Software and Accessories Make
the TRS-80 the Best Supported Microcomputer in the World!



Radio Shack®

The biggest name in little computers™

A DIVISION OF TANDY CORPORATION

Send me your free TRS-80 Computer Catalog today!

Mail To: Radio Shack, Dept. 83-A-181
300 One Tandy Center, Fort Worth, Texas 76102

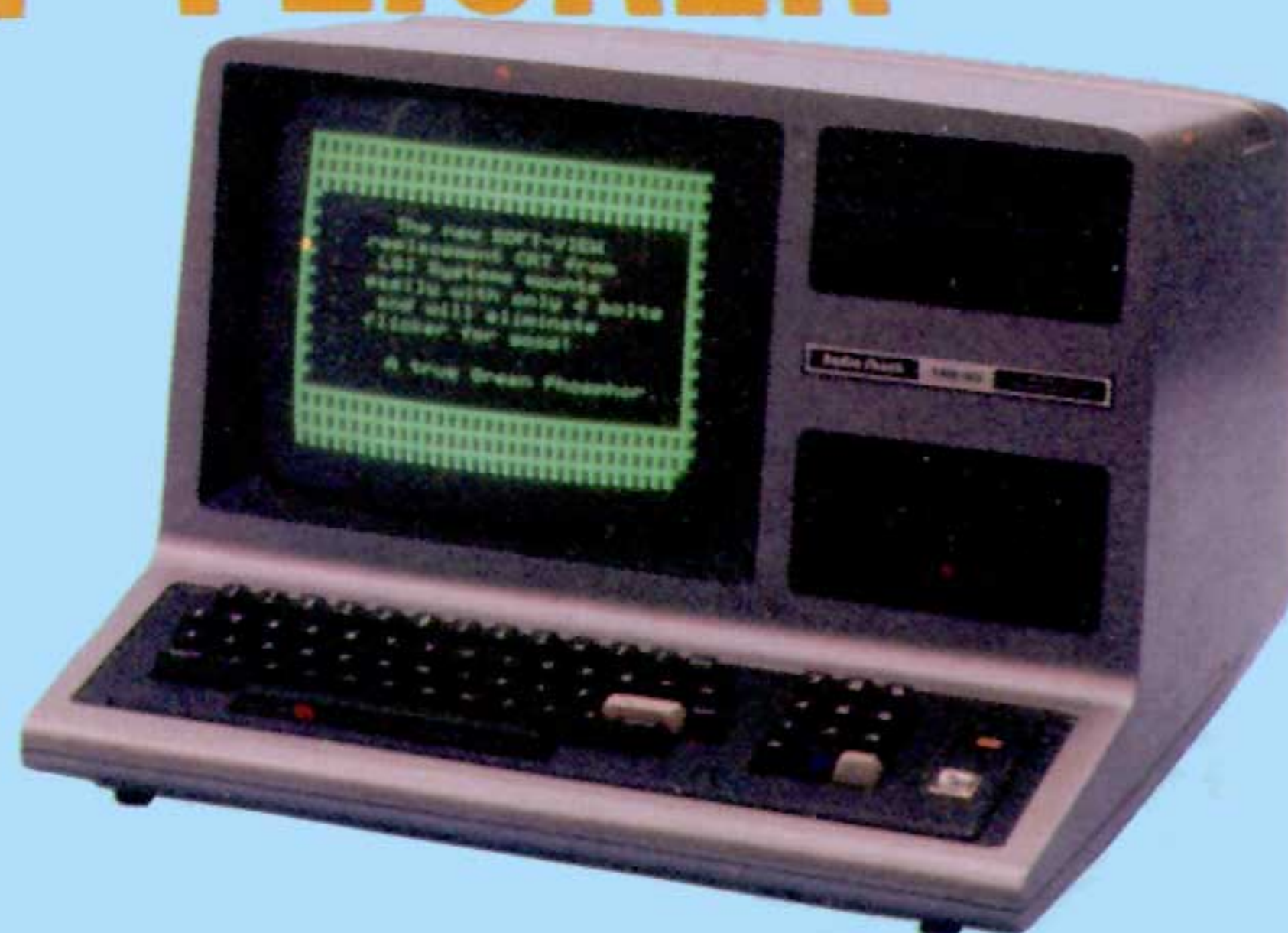
NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

*Price does not include required installation. **Requires boardgame. Retail prices may vary at individual stores and dealers. Some items may require special order. ZORK is a trademark of Infocom, Inc. Monty is a trademark of Ritalm Corp. Scrabble is a registered trademark of Selchow and Richter Co. Monopoly is a registered trademark of Parker Brothers, Inc.

Convert your TRS-80* into a World Class Computer that REDUCES EYE FATIGUE AND DOESN'T FLICKER



...with LSI's new **Soft-View** Replacement CRT...

The black & white "TV Screen" CRT (picture tube) which came with your TRS-80* model II or III is an inexpensive rapid "P4" Phosphor CRT intended for TV use. The display is actually strobing 60 times a second. No amount of "green plastic" will stop this strobing or eliminate the eye fatigue it causes. But a new **Soft-View** CRT display tube with a slower decaying, colored Phosphor will.

- Available in slow-decay green (similar to new IBM* and APPLE III* monitors) or medium decay "European Orange" (easy on the eyes, elegantly beautiful, and the standard for CRT displays in Europe)
- Lead glass stops X-ray emission
- Optional Anti-Glare Frosted Glass available to reduce eye strain from glare
- Easy installation — tube comes with pre-mounted hardware
- 30-Day Money-Back Guarantee
- Ideal for Word-Processing & Programming, fast enough for Games & Graphics
- Finest quality double-dark glass and phosphor fields make the letters seem to be coming out of black space

Try This Test:



Turn the brightness control on your TRS-80* all the way up. Wave your hand up and down in front of the screen. See how jerky it seems? Just like in front of a strobe light! That's because the screen actually is strobing at you. A slower-phosphor CRT will reduce that troublesome strobe effect. That's why most of the newer monitors, from IBM* to Apple III* are using the new slow-phosphor CRT's.

LSI's new **Soft-View** CRT

LSI SYSTEMS **Soft-View** CRT's:

US\$2

- ☐ #GN42 Green Phosphor \$79.95
- ☐ #GN42G Green Phosphor with anti-glare \$89.95
- ☐ #OR34 Orange Phosphor \$89.95
- ☐ #OR34G Orange Phosphor with anti-glare \$99.95

ADD \$7 FOR PACKAGING AND HANDLING AND UPS SHIPPING.

Langley-St. Clair
Instrumentation
Systems, Inc.

To Order Call:
1-800-221-7070
Dealer Inquiries Invited

132 West 24th Street, New York, N.Y. 10011 212-989-6876

IBM, APPLE* and TRS-80* are trademarks of IBM, APPLE Computer & TANDY Corp.

Sweet talker

Teaching your TRS-80 to speak

Model I/III

Edward M. Roberts, Glen Head, NY

Recently, I ran across a crumbling artifact of a time long, long ago: a *Scientific American* of September, 1972. On page 165 was an ad that began: "Votrax — world's first low-cost miniaturized voice synthesizer, opens communication channels between man and machine."

Beneath that terse headline was a picture of three large circuit boards. The text said the size of the device was 10x11x14 inches and the cost was "under \$2000 in production quantities."

Currently, Votrax offers the same capabilities compressed into a 22-pin DIP, designated the SC-01. Steve Ciarcia, writing in *BYTE*, (September 1981), described his implementation of this chip. A 3x4-inch circuit board with four other ICs and a few passive components comprise the entire system, including a parallel interface and a one-watt audio amplifier (excluding the power supply).

Ciarcia's design, which he calls "The Sweet Talker," is available from The Micromint, Inc. Tempted beyond endurance by the \$139 price, I ordered an assembled and tested unit which, together with a nice little power supply and shipping, brought my bill to \$176.

We are at the dawn of the age of the talking gadget. The best known is undoubtedly Texas Instruments' "Speak 'n Spell." If you haven't played with one of these, you owe yourself a trip to the nearest toy

store. National Semiconductor's "Digitalker" is somewhat similar to TI's synthesizer, and is offered by several mail order advertisers in TRS-80 compatible circuits. Almost all such devices have a limited vocabulary stored internally. This is fine for dedicated applications, but severely limits usefulness as a general-purpose peripheral.

The Votrax SC-01 is quite different. It will produce, on request, any of the sounds needed for English speech and will blend each sound into the next, just as a human speaker does. The sounds are generated by sending appropriate ASCII code to the Sweet Talker board via the TRS-80's parallel printer port. Thus, the simple command, LPRINT "ittkCjzkMC" will cause the device to say, "Your turn." Before I go further, let me try to answer the burning question: What does it really sound like?

Well, first off, there's no doubt it's a machine talking. The intelligence we perceive in the inflections of the human voice is simply not there. "Drop dead, dammit!" and "Peace, brother" come out in the same emotionless tone, saved from an absolute monotone only by Votrax's "automatic inflection."

Comprehension depends greatly on context. If your new Buick suddenly said, "Limes halt scurvy," there's not a chance in a hundred it would be understood. So, keeping in mind that speaking comprehension

is poorer than reading, I would rate the intelligibility of The Sweet Talker as excellent. I encoded the following: "I am a TRS-80 computer, my master is Ed Roberts, my name is R17 D23 — do you know my uncle R2 D2?" My wife had some difficulty with this, but a passing telephone repairman understood it instantly. On the other hand, the Lord's Prayer brought forth from my wife the comment that I must be doing something better because it was now so easy to understand. The



complete programmability of the SC-01 makes it possible to compensate for any such problems by choice of vocabulary, word order and even emphasis (which is

Table 1. Phoneme Chart

Phoneme Code	Phoneme Symbol	Duration (ms)	Example Word
00	EH3	59	jacket
01	EH2	71	enlist
02	EH1	121	heavy
03	PA0	47	no sound
04	DT	47	butter
05	A2	71	made
06	A1	103	made
07	ZH	90	azure
08	AH2	71	honest
09	I3	55	inhibit
0A	I2	80	inhibit
0B	I1	121	inhibit
0C	M	103	mat
0D	N	80	sun
0E	B	71	bag
0F	V	71	van
10	CH*	71	chip
11	SH	121	shop
12	Z	71	zoo
13	AW1	146	lawful
14	NG	121	thing
15	AH1	146	father
16	OO1	103	looking
17	OO	185	book
18	L	103	land
19	K	80	trick
1A	J*	47	judge
1B	H	71	hello
1C	G	71	get
1D	F	103	fast
1E	D	55	paid
1F	S	90	pass

Phoneme Code	Phoneme Symbol	Duration (ms)	Example Word
20	A	185	day
21	AY	65	day
22	Y1	80	yard
23	UH3	47	mission
24	AH	250	mop
25	P	103	past
26	O	185	cold
27	I	185	pin
28	U	185	move
29	Y	103	any
2A	T	71	tap
2B	R	90	red
2C	E	185	meet
2D	W	80	win
2E	AE	185	dad
2F	AE1	103	after
30	AW2	90	salty
31	UH2	71	about
32	UH1	103	uncle
33	UH	185	cup
34	O2	80	for
35	O1	121	aboard
36	IU	59	you
37	U1	90	you
38	THV	80	the
39	TH	71	thin
3A	ER	146	bird
3B	EH	185	get
3C	E1	121	be
3D	AW	250	call
3E	PA1	185	no sound
3F	STOP	47	no sound

/T/ must precede /CH/ to produce CH sound.
/D/ must precede /J/ to produce J sound.

determined more by duration than loudness).

The device can speak in either of two programmable pitches, describable as baritone and tenor. A potentiometer on board offers pitch adjustment. An aggressive experimenter would find it possible to secure complete control over pitch since the frequency-determining clock can be controlled externally.

Most methods of indicating pronunciation use symbols not available on a computer keyboard. Consequently Votrax evolved the system shown in Table 1. Observe that it is merely a tool or mnemonic device; the actual instruction to the chip is a one-byte code. In the case of the TRS-80/Sweet Talker, this code corresponds to the ASCII characters 64 to 127 for the low pitch, and the numbers 192 to 255 for high pitch.

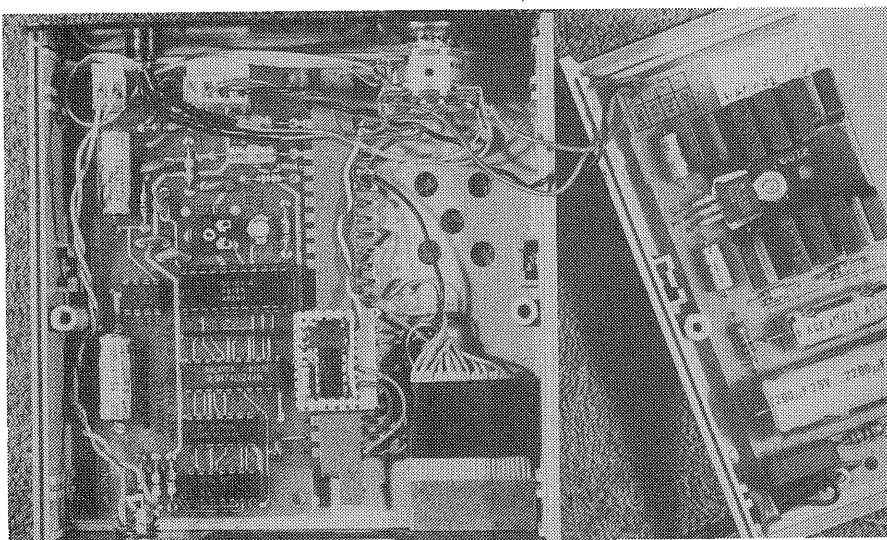
The Votrax phoneme notation is logical and easy to learn. Although there are about 45 sounds in English, Votrax has expanded this to 64 by offering vowels in different lengths, as well as two different pauses and a stop. Kathryn Fons and Tim Gargagliano (employed by Votrax as speech scientist and computer engineer, respectively) prepared an article, "Articulate Automata — An Overview of Speech Synthesis." It appeared in the February, 1981, *BYTE* and is well worth searching out. It contains much specific information on using the Votrax synthesizer and

translating words into a suitable phonetic form for synthesis. A footnote comments that these two people have a particular interest in the needs of speech handicapped and they welcome inquiries in this area.

Two somewhat unrelated comments are in order here. First, Radio Shack's discontinued Voice Synthesizer, although similar in principle to the Sweet Talker, was connected differently and used different ASCII characters to encode the phonemes. Second, the Votrax "TYPE-'N-TALK," now being advertised for \$375, is a complete unit with the added capability of direct translation of text to speech. That is, if you type, "Mary had a little lamb," it will say, "Mary had a little lamb."

Interfacing The Sweet Talker to the TRS-80 is fairly easy. Note, however, that it consists only of a completed circuit board. You must make up the connections and supply a speaker yourself. Soldering skills, the ability to understand simple schematics, and an elementary understanding of a parallel interface are desirable. Micromint's nicely prepared manual is helpful.

"The Sweet Talker" connects directly to the parallel printer port of the Model III or the expansion interface box of the Model I. An unexpanded Model I would require the active printer cable. Since I already had a printer connected to my Model III, I made a "Y"



The Sweet Talker board mounted in the bottom half of a Radio Shack case, with the power supply in the top half. The pulse extender (see text) was assembled on a piece of perfboard and mounted on the connector with foam tape.

connection by installing a 25-pin D-submini male connector (Radio Shack #276-1559) across the first 25 lines of my printer cable. The matching female connector (#276-1565) plugs into this. An 18-inch piece of 25-conductor cable, made up from #278-771, and a card edge socket (#276-1550) completed the connection. Both printer and Sweet Talker remain connected at all times, with selection being made by switching on the desired device and turning off the other.

To complete the job, I bought Radio Shack's Deluxe Project Box (#270-218), an LED pilot light, a mini jack for the speaker connection and a miniature 10K panel mounted volume control with a DPST switch (#271-215). This replaces the PC-style pot on the Sweet Talker board

and switches both the 5-volt and 12-volt lines. My Radio Shack bill for all this was a mere \$30.

The photo shows the box with the top open and the power supply mounted on the top half of the cabinet. Along the connector is mounted a little piece of perfboard — my only real criticism of The Sweet Talker. The manual explains that the strobe input line must remain low for 100 microseconds, but that the pulse from the TRS-80 is only one microsecond or so. It is necessary to make up a little one-shot or pulse extender circuit consisting of an IC, a resistor and a capacitor. Micromint supplies the parts, and assembling them is easy enough, but they really should have been provided on the main board.

The Micromint power supply

consists of a heavy wall transformer and a well-made board rated at 5 volts — 300 MA, and +12 and -12 volts at 50 MA each. I measured The Sweet Talker as drawing 80 MA at 5 volts and 30 MA at +12 volts. Many users may have alternatives to paying \$29 (kit) or \$37 (assembled and tested) for the Micromint supply.

I have a final note of caution. As I've grown accustomed to its voice, I'm beginning to think of it as a real person in there... a good friend... an old friend who talks to me... ■

Sweet Talker is available for \$139 from The Micromint, Inc., 917 Midway, Woodmere, NY 11598, 1-800-645-3479 (orders), 1-516-374-6793 (information).

AFRAID OF HIGH SOFTWARE PRICES?

TRS-80

**6 to 8 programs on CASSETTE every MONTH
for (shudder) about 75 cents per program!**

TRS-80

**M
O
D
E
L
I
&
I
I
I**



The Fine Print

All issues from Oct '78 on available — ask for list (24 Level I issues also). Programs are for 16K Level II, 16K Model III, and occasionally for disks. TRS-80 is a trademark of Tandy Corp.

30

P.O. Box 1448
Santa Barbara, CA 93102 (805) 962-6271



The Bottom Line:

1 year (12 issues)	\$50.00
6 months (6 issues)	\$30.00
Single copies	\$ 6.00
Back issues	\$ 6.00
Good Games #1	\$12.00
Adventures #1	\$13.00

California residents add 6% to single copies. North America — First Class Postage Included. Overseas — add \$10 to subscriptions, and \$1 to single copies. Sent AO rate

MasterCard/Visa

Writing your own programs can be a scary proposition. And typing in a program from a hardcopy listing is a real nightmare! Bring on the dawn with a subscription to CLOAD or CHROMASETTE Magazine.

CLOAD and CHROMASETTE Magazines are monthly cassettes containing 6 to 8 ready-to-load programs apiece. Programs that take advantage of features unique to each computer (CLOAD for the Model I and III, CHROMASETTE for the Color Computer). Programs that even extend the capabilities of your computer beyond its manual's dark type! Quality game, tutorial, practical, and utility programs that reach your home by First Class Mail each month.

Don't be afraid. Get a subscription to CLOAD or CHROMASETTE Magazine. Or just enjoy a little taste and sink your fangs into a back issue. It won't take a bite out of your wallet...



The Bottom Line:

1 year (12 issues)	\$45.00
6 months (6 issues)	\$25.00
Single copies	\$ 5.00
Calif. residents add 6% to single copies	
North America — First Class Postage Included	
Overseas — add \$10 to subscriptions, and \$1 to single copies	
Sent AO rate	

31

P.O. Box 1087,
Santa Barbara, CA 93102
(805) 963-1066

**C
O
L
O
R**

**C
O
M
P
U
T
E
R**

The Fine Print: Issues are sent First Class Mail. All issues from July 1981 on available — ask for list. Programs are for the Extended BASIC model and are occasionally for disks.

Integrated accounting

An evaluation of Plus Computer Technology's General Ledger

Model III, 48K with 2 disks

80 U.S. Staff
Based on notes and observations by John Strader, CPA

The problem of finding just the right business software for microcomputers seems to have been with us since day one. This is due, no doubt, to the diversity of business operations. We seem to expect the software to conform to *our* way of doing business, and are prone to adapt our business operations to available software.

Another problem with business software is that it is usually rather expensive, and one must pay the piper in order to find that it is not what was expected, or that it will not do the job.

We were told, by several readers, of the merits of Plus Computer Technology, Inc., and their integrated business software for the Model II and III. Accordingly, we solicited a Model III system from them. In addition to several days of operation at *80-U.S. Journal*, we asked our CPA, John Strader, to use it and comment on it. The following commentary is based on our own experience as well as that of our CPA.

System Overview

The packages included are: General Ledger, Accounts Receivable, Accounts Payable, Payroll, Fixed Assets and a utility called Easytrak. These are available as a complete package, or each program may be purchased separately. The price per package for the Model III is \$325.00 (Easytrak is \$125.00). The Model II prices are slightly higher.

All of the programs operate under TRSDOS. The features of each program are extensive. Each program is packaged in its own attractive binder. The documentation is complete and easy to follow. Because of the extensive features of each program, the documentation for each is almost two inches thick

in a three-ring binder.

The company supports their software for the first 60 days at no additional charge. After the first 60 days, a maintenance program is available for an additional fee of \$100.00 per package. This includes support and technical bulletins, as well as a newsletter covering all of the packages.

The entire system is interactive. The way they make it so is rather interesting. A master diskette is provided which is used with all of the available programs. The master diskette is used to "boot up," after which a menu appears and you may select the package you wish to run.

If you choose Accounts Receivable (for example), the master diskette menu will tell you when to remove the master diskette and insert the Accounts Receivable diskette and its data diskette. You may choose not to have an interactive system. In any case, after you finish with Accounts Receivable, you are instructed to insert the master diskette again. It collects the data which must be transferred to another of the packages.

If you decide not to be interactive, the lineprinter will print the data which must be posted manually to the appropriate package. The decision to go interactive may be made even after manual transfer has been in operation for a time. This assumes, of course, that general ledger numbers were properly assigned in the first place. The master diskette is also used to install the various programs and to initialize them.

The system uses a machine language subroutine for screen input in all programs. This makes input of information fast and easy. Each program is completely menu driven, and there are several menus for

each. The menu always shows which screen you are using at the upper left of the video monitor. The @ key is used to step through the various menus.

The many menus used in this system seem intimidating at first. After doing some work with the system, however, this becomes routine.

The General Ledger

The General Ledger program for the Model III with two drives will handle 150 to 600 accounts with 1500 to 3000 journal entries per month. The files may be expanded if more drives are added to the system.

It is possible to review file status and various processing months with this system. This General Ledger has a journal entry routine which gives plenty of flexibility to make entries and changes to the entries. It allows posting of corrections, or adjusting entries not posted in the other application programs in the system.

Like other General Ledger programs, this one will prepare a general ledger, balance sheet and income statement. It also has a significant number of items which make it a valuable tool for any business. The income statement can be structured to meet your individual needs. You may enter your own headings and account-total descriptions. You can compare year-to-date and monthly income figures with prior years figures. You also have the ability to print an income statement which compares amounts for the current month and year-to-date with budgeted amounts for those periods. These features are especially important during the current economic situation.

The specialized report request is another attractive feature of the General Ledger program. It allows you to build a special report by selecting various accounts. The structure of this report is entirely user-defined—you could select all of the sales accounts for a detailed sales analysis report.

The General Ledger reports are designed for an accountant, and will provide you with all of the traditional accounting reports except the Changes in Financial Position and Retained Earnings Report. These two reports are required by generally-accepted accounting principles, but are not usually produced by the majority of smaller public companies.

The program has good audit trails. These are important if you want to follow an individual entry through the different application program reports.

The General Ledger program also produces a monthly trial balance, quarterly trial balance, comparative balance sheet, detail general ledger, journal activity report, master chart of accounts, budget worksheet, and financial statement footnotes.

The only significant shortcoming observed with the General Ledger is that no "other assets" or "other liabilities" classifications are available in the balance sheet. The income statement did not appear to handle departmental reporting. Perhaps this may be done with the special report feature, which provides essentially the same information.

The General Ledger package is impressive. We will take time to evaluate other packages in this integrated system in later issues. ■

This package is available from Plus Computer Technology, Inc., 6900 North Austin Ave., Chicago, IL 60648. Since the writing of this evaluation, several revisions have been made to the package. Balance Sheet categories for "other assets" and "other liabilities" have been added, 2400 character footnotes are available, and an expanded form Income Statement which is totally user-defined has been added to the Financial reports.

Now...from Dr. David Lien, the master of making the difficult simple, comes the complete way to **HARNESS YOUR TRS-80**

Face it. Until you can talk to and understand your Model I, II, III or 16 Tandy TRS-80*, it's nothing more than a mass of microcircuits in a plastic box.

You need help to harness your TRS-80 and make it work for you. And that's just what you get from *Learning TRS-80 BASIC*.

Written by David Lien, author of the popular *TRS-80 User's Manual for Level I*, *Learning Level II* and *The BASIC Handbook*, *Learning TRS-80 BASIC* is at once entertaining, informative and easy to understand. It's the perfect guide to entering the world of microcomputers.

In *Learning TRS-80 BASIC*, David Lien gives you simple, step-by-step instructions, including programs you can use in business or home finance, for entertainment, or to help troubleshoot problems. You'll even learn to write your own custom software. Ideal for the classroom, too.

Included are short Question and Answer sections which help make sure you understand everything you've learned — it's almost like a correspondence course... without the correspondence!

No matter if you own the Model I, II, III or 16, *Learning TRS-80 BASIC* is one book no TRS-80 owner should be without.

Available at better computer and book stores,
or call (800) 854-6505

In California (714) 588-0996

Ask about the Basic Handbook, too. To order by mail, send check or money order for \$19.95 (California residents add 6%), plus \$1.65 shipping and handling. Overseas orders send \$19.95 plus \$2.50 surface shipping and handling. All books have a 30-day money-back guarantee — you can't lose.

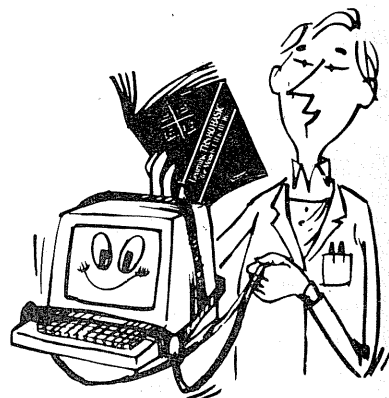


32

CompuSoft® Publishing

1050-E Pioneer Way, Dept. G, El Cajon, CA 92020

*TRS-80 is a registered trademark of the Tandy Corporation.



Files and foibles

Binary tree file handling

Model I/II/III

© 1982, T. R. Dettmann, Associate editor

We previously introduced the binary tree as a data structuring device that allows rapid access to any part of a data base. This time, we'll go over a complete program listing for a simple binary tree file handling program. All the complications are now incorporated and we can add, edit and delete. There are some changes, so work through the program carefully.

Binary Trees

Binary trees come out of the combination of linking techniques we've learned and the basic binary divide and conquer technique. Since we've covered linking, let's look at the binary divide and conquer technique.

Let's say we have an array to search for something. Maybe it's a list of 1000 names. If we start searching in the array at the first element and proceed until we find it, we would have to look at one-half of the array (on the average).

With the binary technique (properly called the binary search), we can cut this down to 10 tries at most! The basic procedure involves first sorting the array into order. Then, look at the center element. If we have what we want, we are done. If not, we look to see if the element we want is less than the center one. If it is, we only worry about the first part of the array up to the center element and repeat the procedure by taking the center of this portion of the array and dividing again if we haven't found the correct element. Try this a few times to see how it works. See if you can take more than 10 tries in a list of 1000 items. If you do, you've probably done it wrong. If we make a BASIC subroutine to search array A, of N items, for item X, we get:

```
1000 REM BINARY SEARCH
1010 LW=1:HI=N
1020 MPT=(HI+LW)/2
1030 IF A(MPT)=X THEN PRINT"FOUND AT
";MPT: RETURN
1040 IF X<A(MPT) THEN HI=MPT-1: GOTO1020
1050 LW=MPT+1: GOTO1020
```

Try this by hand on a small array (say 10 items) to see how it works.

How does this relate to the binary tree? By using pointers, we can make the tree the same as the sorted list with a midpoint (the root), a less than side (left sub-tree) and a greater than side (right sub-tree). By using the

same decision process, we can eliminate half the tree with every comparison.

For a tree however, this only works if the whole structure is "balanced." If we think of each data item as weighing one pound, then for any given element, the left sub-tree should weigh as much as the right sub-tree.

How do you prevent a tree from getting out of balance? With a binary tree, it works best if the data items are entered in random order. If you enter them in sorted order, the tree will be out of balance.

Try this experiment with the sample program: Make up a list of names or numbers to enter. Enter them in sorted order and print the full list. Then, draw the binary tree with arrows as shown in Figure 1. Next, kill the data file and enter the same names in random order. Draw the tree again. Do you see the difference? See Figure 2.

The procedures for printing the tree and deleting a data item were not talked about before when we discussed trees. Look over the listings to see how they work.

The printing routine at line 4200 prints the tree out in sorted order. This requires implementing a recursive procedure. If you look at Figure 3 carefully, you'll see that it could be written as a recursive procedure like this:

Get the current element.

If its left pointer isn't zero, Print the left sub-tree.

Print the current element.

If its right pointer isn't zero, Print the right sub-tree.

Understand that when we say print a sub-tree, we start the whole procedure over from the beginning with the new current element being the root of the sub-tree.

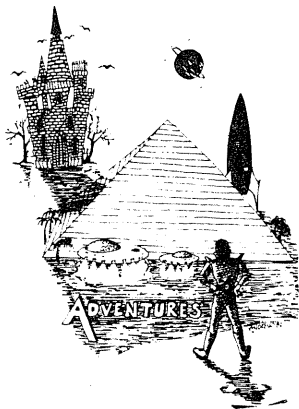
The program does not use a recursive GOSUBing technique. Instead, all of the GOSUBs are replaced by equivalent GOTOs. Try rewriting the printing procedure using the recursive calling techniques from the August installment.

The delete procedure is fairly intricate since we have to move the two sub-trees of the element we're deleting to appropriate places. Work through this one by hand until you understand it.

The program was written on a Model II and has been run on Model I and III with minor changes. It's also been run under CP/M using Microsoft MBASIC. For the Color Computer, the most significant problem is the fact that there is no LOF function. That's noted in the

QUALITY SOFTWARE FOR TRS-80 COLOR AND OSI

ADVENTURES AND QUEST ALSO FOR SINCLAIR AND VIC-20



ADVENTURES!!!

For TRS-80 COLOR and OSI. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16k on TRS80, TRS80 color, and Sinclair. They require 8k on OSI and 13k on Vic-20. Derelict takes 12k on OSI. \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons — but they forgot to take you, and now you are in deep trouble.

HAUNTED HOUSE (by Bob Anderson)

It's a real adventure—with ghosts and ghouls and goblins and treasures and problems — but it is for kids. Designed for the 8 to 12 year old population and those who haven't tried Adventure before and want to start out real easy.

DERELICT

(by Rodger Olsen & Bob Anderson)

New winner in the toughest adventure from Aardvark sweepstakes. This one takes place on an alien ship that has been deserted for a thousand years — and is still dangerous!



VENTURER!—A fast action all machine code Arcade game that feels like an adventure. Go berserk as you sneak past the DREADED HALL MONSTERS to gather treasure in room after room, killing the NASTIES as you go. Great color, high res graphics, sound and Joystick game for the TRS-80 Color or OSI machines. (black and white and silent on OSI.) Tape only. \$19.95.

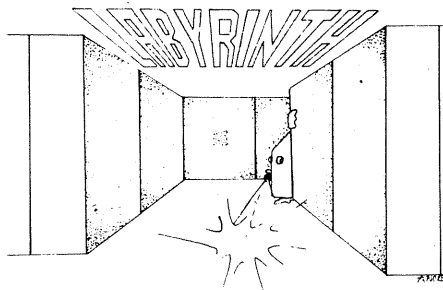
BASIC THAT ZOOOMMS!!

AT LAST AN AFFORDABLE COMPILER FOR OSI AND TRS-80 COLOR MACHINES!!! The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

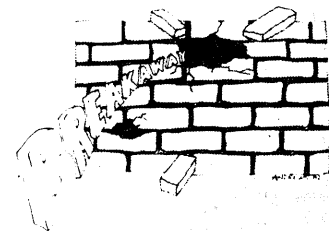
It does have some limitations. It takes at least 8K of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20 page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI or TRS-80 Color.

LABYRINTH — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95. (8K on OSI)



QUEST — A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TRS-80, TRS-80 Color, and Sinclair. 13K VIC-20. \$14.95 each.



NEW!!

BREAKAWAY — ALL MACHINE CODE — Every computer has some form of BREAKAWAY available. Ours is fast, smooth, has 15 levels of difficulty — and is a bargain!! 16k TRS-80 Color only \$9.95.

PROGRAMMERS!

SEE YOUR PROGRAM IN THIS SPACE!!

Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.

Please specify system on all orders

ALSO FROM AARDVARK — This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send \$1.00 for our complete catalog.

AARDVARK - 80

2352 S. Commerce, Walled Lake, MI 48088

(313) 669-3110

Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.



TRS-80 COLOR

SINCLAIR

OSI

VIC-20

PMC SOFTWARE

SPECIAL DOSPLUS

V 3.3
Disk \$49.00
Save \$50.00

PRESENTS

NEW Stellar Escort

by BIG 5
Tape 12.00
Disk 15.00


Electric Pencil

PMC version of orig.
for PMC/Mod I
Tape \$24

UNBEATABLE PRICES!

BUSINESS	DISK		CASS	
	LIST PRICE	OUR PRICE	LIST PRICE	OUR PRICE
SMALL BUSINESS SYSTEMS GROUP				
Accounts Payable (48)	195.00	155.00	n/a	
Accounts Receivable (48)	195.00	155.00	n/a	
General Ledger (48)	195.00	155.00	n/a	
Inventory Control (48)	195.00	155.00	n/a	
Payroll (48)	195.00	155.00	n/a	
GAMES				
Adventure International				
Armor Patrol	24.95	19.00	19.95	15.00
Barlog - Maces and Magic #1	29.95	23.00	n/a	
Conquest of Chestwood	20.95	16.00	19.95	15.00
Earthquake San Francisco 1906 (I)	20.95	16.00	19.95	15.00
Eliminator	24.95	19.00	19.95	15.00
Lunar Lander	20.95	16.00	14.95	11.00
Missile Attack	20.95	16.00	14.95	11.00
Morton's Fork - Maces and Magic #3 (I)	29.95	23.00	n/a	
Planetoids	20.95	16.00	19.95	15.00
Scot Adam's Adventure #1 #2 #3	39.95	31.00	n/a	
Scot Adam's Adventure #10 #11 #12	39.95	31.00	n/a	
Scot Adam's Adventure #4 #5 #6	39.95	31.00	n/a	
Scot Adam's Adventure #7 #8 #9	39.95	31.00	n/a	
Sky Warrior	20.95	16.00	14.95	11.00
Space Intruders	20.95	16.00	19.95	15.00
Star Fighter	29.95	23.00	24.95	19.00
Star Trek 3.5	19.95	15.00	14.95	11.00
Stone of Sisyphus - Maces and Magic #2 (I)	29.95	23.00	n/a	
Big Five				
Attack Force	19.95	15.00	15.95	12.00
Cosmic Fighter	19.95	15.00	15.95	12.00
Defense Command	19.95	15.00	15.95	12.00
Galaxy Invasion	19.95	15.00	15.95	12.00
Meteor Mission	19.95	15.00	15.95	12.00
Robot Attack	19.95	15.00	15.95	12.00
Super Nova	19.95	15.00	15.95	12.00
Cornsoft				
Scarfman	19.95	15.00	15.95	12.00
Space Castle	19.95	15.00	15.95	12.00
INFORMATION PROCESSING				
Adventure International				
Maxi Manager (48)	99.95	79.00	n/a	
OPERATING SYSTEMS				
Micro Systems Software				
Dos Plus V3.3 (I)	100.00	80.00	n/a	
UTILITIES				
Howe				
MON3 (I)	n/a		39.95	31.00
MON4 (I)	49.95	39.00	n/a	
STERM (I)	n/a		69.95	55.00
System Diagnostic	99.95	79.00	n/a	
WORD PROCESSING				
Michael Shrayor Software				
Electric Pencil (I)	n/a		100.00	24.00
Aspen Software				
Grammatik (I)	59.00	46.00	n/a	
Proof Edit (I)	30.00	23.00	n/a	
Proofreader (I)	54.00	42.00	n/a	
Soft-Screen (I) (48)	69.00	54.00	n/a	
Soft-Text (I) (48)	69.00	54.00	n/a	
MISCELLANEOUS				
Box of 10 5 1/4-inch Diskettes Microsette			25.00	
Box of 10 C-10 cassettes Microsette			7.50	
Box of 10 C-20 cassettes Microsette			9.00	
Box of 10 C-60 cassettes Microsette			11.00	
Box of 10 C-90 cassettes Microsette			15.00	
Adventure 1 thru 12 - Hints Sheets per adventure			1.00 ea.	

Software runs on PMC/LNW/MOD I/III
32K DISK/16K CASSETTE UNLESS MARKED. # 34

475 ELLIS ST., MT. VIEW, CA 94043

Order Only CALL (415) 962-0318
Information CALL (415) 962-0220

Terms: FOR FAST DELIVERY, send certified checks, money orders, Visa or Master Card number and expiration date. Personal checks require 3 weeks. U.S.A. sales only. PRICES INCLUDE U.P.S. continental delivery (do not use P.O. Box). CALIFORNIA customers add 6 1/2% tax. Prices subject to change.

Files

remarks. If you want to try this on a Color Computer, you'll have to keep track of the length of the file in the file (you could put it in some unused space in record 2).

I think you'll have fun with this one. By expanding the data area, you can make a very versatile data base manager for yourself.

Ed. Note — Model II owners: Following the Binary Tree listing is last month's Tower of Hanoi Program adapted to Model II graphics.

Figure 1

Binary Tree formed by entering sorted list.

LIST: Albert, John, Larry, Mike, Terry, William

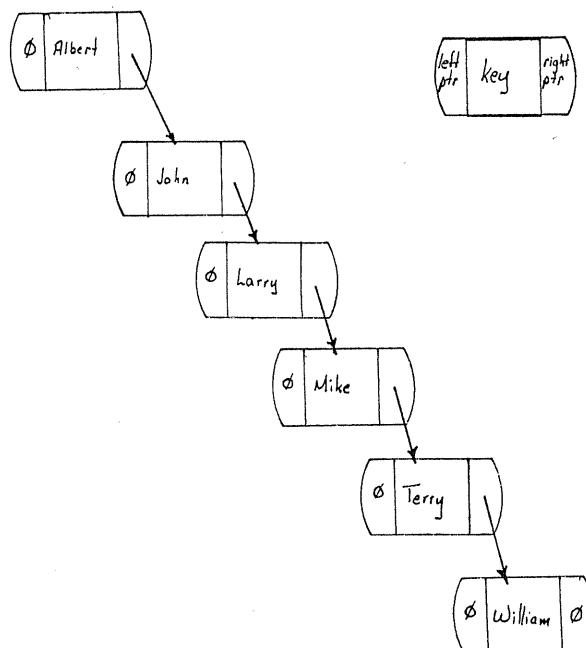
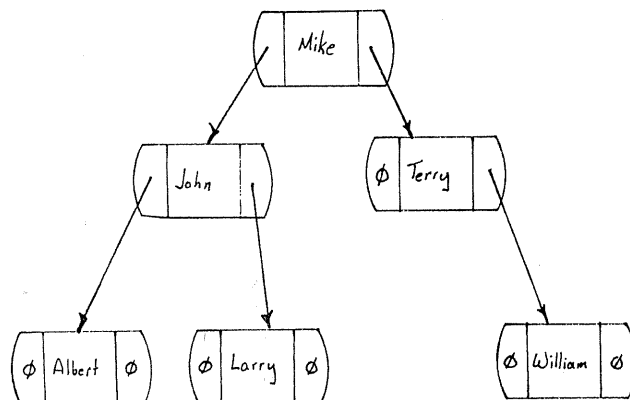


Figure 2

Binary Tree formed by entering random list.

LIST: Mike, Terry, John, Larry, William, Albert



II + II = (BUSINESS DYNAMICS)

DOSPLUS II and the TRS-80 model II. The Dynamic Duo.

The TRS-80 model II was created to help you take care of your business. DOSPLUS II was created to help your TRS-80 help you and your business even more.

DOSPLUS II replaces your O.E.M. dos with an ultra-sophisticated operating system that is 5 or more times faster, more reliable and is totally compatible with all standard business oriented software designed for use with the model II. The result is a computer/operating system that far exceeds manufacturer's specs—with more potential and more capacity to be of service to you.

DOSPLUS II operating systems are available for either your floppy or hard disk drives. The hard drive operating system is compatible with Radio Shack,

QuCeS, Corvus Micro Mainframe, VR Data and other popular hard drive sub-systems.

DOSPLUS II... All the quality and dependability you'd expect from DOSPLUS.

For the dealer nearest you call
1-800-327-8724

Dealer inquiries invited.

\$249.95

For product information (305) 983-3390

DOSPLUS

DOSPLUS first in quality!
First in the industry!

To order call toll free 1-800-327-8724

RAJEWERSOFT

A Division of Breeze/QSD, Inc.
11500 Stemmons Fwy., Dallas, Texas 75229
(214) 484-2976 Micronet 70130, 203

35



**MICRO SYSTEMS
SOFTWARE, INC.**
4301-18 Oak Circle,
Boca Raton, FL 33431

September, 1982 65

Introducing... Data-Writer™

A powerful information processing system that interfaces text processing and data management.

Users have praised Midwest Data System's Auto-Writer for its unique, versatile approach to data base management.

Now DATA-WRITER does even more:

- New Data Entry program to create your data base or add records to an existing data base. It has error checking features and supports both fixed and variable length fields.
- New File Editor lets you edit your data base without an independent word processor. Or, if you prefer, use your own word processor (Electric Pencil, Lazy Writer or Scripsit) to create and edit your data base.
- New Field Manager that lets you add, delete, re-order or append fields and merge or split data bases.
- New interactive, double-precision Math program that processes up to 20 equations of up to 255 characters using numbers you enter and your data base field labels. It includes an in-memory scratch pad to store temporary values. Insert them into other equations for a cascade of increasingly complex mathematical statements. Store your series of equations on disk as procedure files to use any time you need them.
- New two-level Sort that enables you to use nested sorts for complex ordering of data files. Sort on any field, without having previously designated it as a key.
- New Mailing Label program that allows you to print multiple labels from one to four across and to insert a variable from the keyboard or a fixed message on every label.
- Form Letter processor that allows you to insert data from your data base into a form letter or contract.
- Report Generator for columnar tabulations with automatic headings, pagination, totals and subtotals, and sophisticated formatting control. **DATA-WRITER'S** unique flexibility enables you to modify your report format as you wish, without the need to scrap it and start fresh.
- Powerful Select-If command that lets you define a subset of your data base. New instring selection capabilities. With Select-If and Sort, you can create dozens of new data bases for specific purposes.
- Statistical check on your data base to locate data entry errors. Stats also reports maximum entered data length for each defined field, a tremendous aid when designing a report.

DATA-WRITER is both powerful and easy to use. It has speed and versatility not available in any so-called data base management system. As one Auto-Writer user said, "Why hasn't someone done this before!"

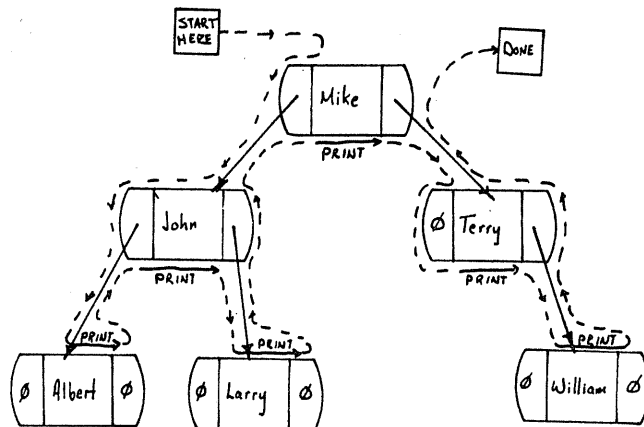
For the TRS-80 Model I/III (48K, 2 disk drives, lower case required). Available at your favorite software store, or order from **Software Options**, 19 Rector Street, New York, N.Y. 10006. 212-785-8285. **Toll-free order line: 800-221-1624.** Price: \$125 (plus \$3 per order shipping and handling). New York State residents add sales tax. Visa/Mastercard accepted.



36

Files

Figure 3
Path to print tree in Sorted Order.

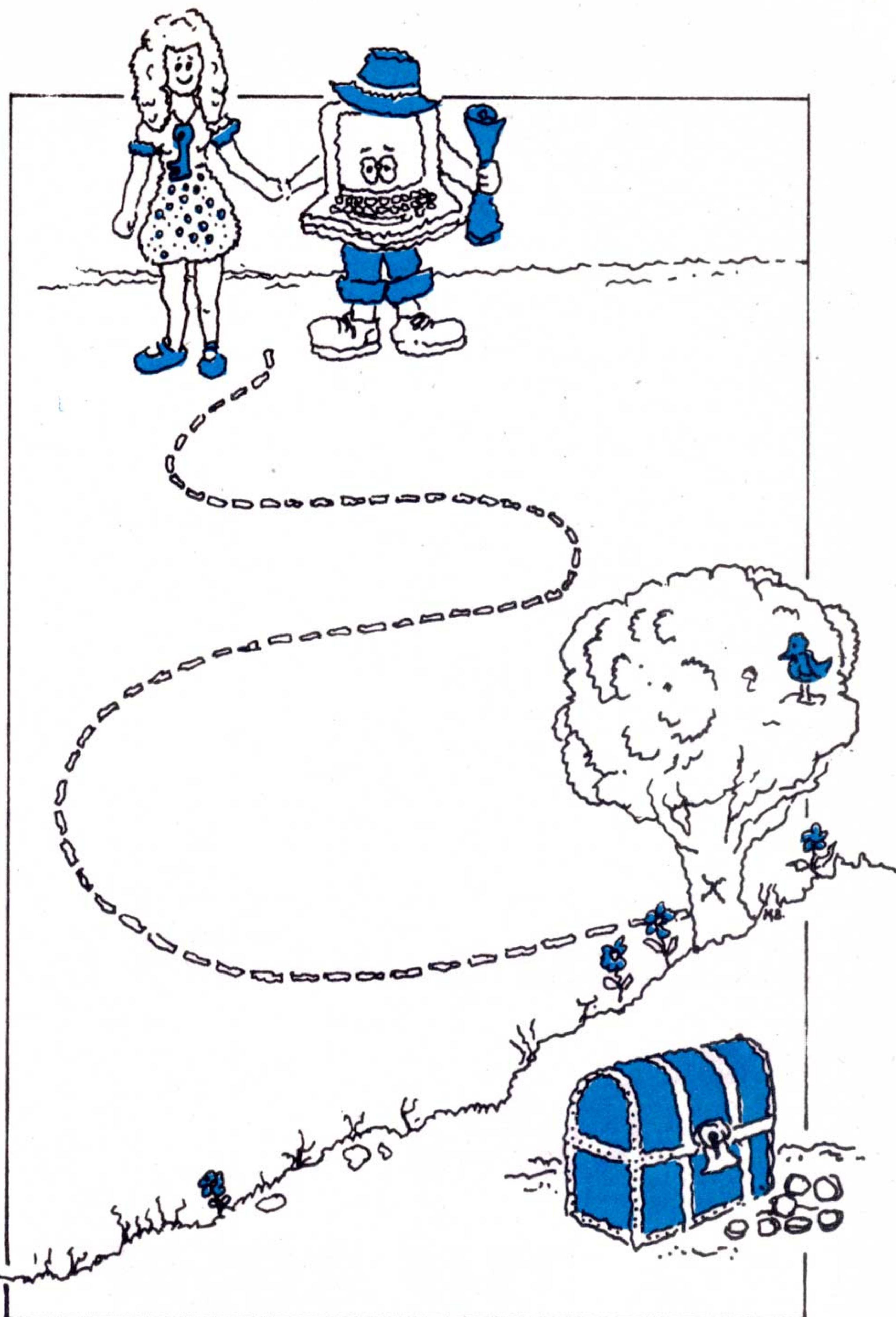


Listing 1

```

95 REM          INITIALIZE THE PROGRAM
100 CLEAR10000:DEFINT A-Z:DIM STK$(30),S
TK(30)
105 REM          GET THE DATA FILE & DEF
INE IT
110 OPEN"R",1,"BINARY/DAT",60
120 FIELD#1, 20 AS KEY$,2 AS LP$,2 AS R
P$,36 AS DT$
130 FORI=1TO30:FIELD#1,(I-1)*2 AS DUM$,
2 AS STK$(I):NEXT I
135 REM          DEFINE THE POSSIBLE COM
MANDS
140 PC$="ADD  EDIT  DELETEPRINT HELP
END  "
145 REM          THIS FUNCTION PRINTS A
GRAPHICS CHARACTERS AND THEN BACKS UP
150 DEF FNFLD$(X)=STRING$(X,144)+STRING
$(X,28)
155 REM          CHECKS TO SEE IF THE FI
LE ALREADY EXISTS, IF NOT THEN
156 REM          THE FILE IS INITIALIZED
FOR USE BY STARTING THE STACK
157 REM          AND INITIALIZING THE LI
ST HEAD RECORD
160 IF LOF(1)=0 THEN LSET STK$(1)=MKIS(
1):PUT1,1:LSETKEY$="":LSETLP$=MKIS(0):P
UT1,2
165 REM          PRINT LOGIN MESSAGE
170 CLS:PRINT"BINARY TREE DEMONSTRATION
"
180 PRINT"TYPE <HELP> FOR A COMMAND LIS
T"
```


How to hunt for hidden treasure with your TRS-80.



Captain 80 Book of BASIC Adventures.

Thar's GOLD in them thar plots!

Eighteen tantalizing, challenging fantasy adventures in which YOU play the role of adventurer and hero! Finding treasures and achieving goals while trying to avoid deadfalls and other insidious obstacles are just a few of the things you'll experience in the *Captain 80 Book of BASIC Adventures*.

This 252-page book contains eighteen exciting adventures edited by Bob Liddil of The Programmer's

Guild. Seven chapters tell you the what, when, where, why and how of adventures, including how to play, write and sell your own programs. Although written for the TRS-80 Models I and III, these adventure programs will easily adapt to most computers using Microsoft® BASIC.

The highlight of this book is the Adventure Generator. This program requires disk BASIC and will actually write another BASIC program around your imaginative instructions!

Please send _____ copies of the ADVENTURE BOOK for only \$19.95 each, plus \$2.05 shipping and handling. Check, M.O., VISA MC# enclosed. C.O.D. orders accepted.

Name _____

Address _____

City _____ State _____ Zip _____

VISA MC# _____ Exp Date _____

Signature _____

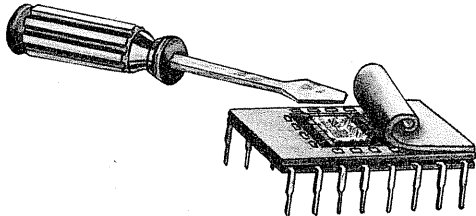
SEND TO:
80-NW Books
3838 So. Warner St., Dept. C, Tacoma, WA 98409
DEALER INQUIRIES INVITED


```

200 REM - - - - - COMMAND LOOP -
- - - - -
205 REM      THERE CAN BE 2 WORDS ON
      A LINE (FW$ & LW$), INITIALIZE TO
206 REM      NOTHING AND GET A COMMA
ND
210 FW$="":LW$="":LINE INPUT">>";CD$
215 REM      IF THERE IS NO BLANK IN
      THE LINE, ASSUME ONLY 1 WORD
220 L=INSTR(CD$," "):IF L=0 THEN FW$=CD
$:GOTO250
225 REM      OTHERWISE, GET THE TWO W
ORDS
230 FW$=MID$(CD$,1,L-1):LW$=MID$(CD$,L+
1)
235 REM      GET RID OF LEADING BLAN
KS ON THE LAST WORD
240 IF MID$(LW$,1,1)=" " THEN LW$=MID$(
LW$,2):GOTO240
245 REM      IS THE COMMAND IN PC$?
FIND IT
250 CD=INSTR(PC$,FW$):IF CD=0 THEN PRIN
T"COMMAND ERROR - TRY HELP":GOTO200
255 REM      GET THE NUMBER OF THE C
OMMAND
260 CD=INT(CD/6)+1
265 REM      EXECUTE THE COMMAND
270 ON CD GOSUB 1000,2000,3000,4000,500
0,3000
280 GOTO200
300 REM - - - - - END OF PROGRAM -
- - - - -
305 REM      CLOSE OUT THE PROGRAM N
ORMALLY
310 CLOSE:CLS:PRINT"GOODBYE":END
400 REM - - - - - INPUT A CHARACTER
- - - - -
405 REM      WAIT HERE UNTIL A SINGL
E CHARACTER IS TYPED AT THE KEYBOARD
410 C$=INKEY$:IFC$=""THEN410
420 RETURN
500 REM - - - - - INPUT A LINE - -
- - - - -
505 REM      PRINT THE INPUT FIELD &
      SET THE INPUT BUFFER (IN$) TO NOTHING
510 PRINT FNFID$(ZF);:IN$=""
515 REM      GET A CHARACTER, IF IT'
S <ENTER> THEN WE'RE DONE
520 GOSUB400:IF ASC(C$)=13 THEN RETURN

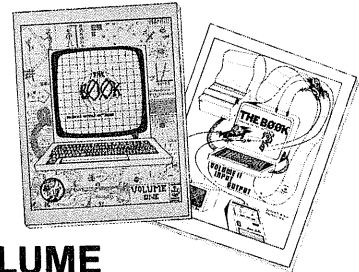
```

Accessing the TRS-80* ROM...



←or→

It's your choice:
do it the hard way, or
get the information you need from



THE BOOK VOLUME I & II

Comprehensive Guide to TRS-80* Assembly Language Routines

Each Volume Priced At \$14.95 Plus \$1.50 Shipping/Handling

VA residents add 4% tax • Foreign: send U.S. funds, add \$4 ea. for overseas delivery

*Trademark of Tandy Corp.

VOLUME I

The most complete book yet on the math routines of the BASIC ROM, Models I & III. Contains a wealth of detail about integer, single and double precision formats, advanced math, data manipulation, and assembly language interfacing, with examples. Includes commented listing (0708H-1607H), plus a highly detailed map of the ROM and reserved RAM.

INSIDERS SOFTWARE CONSULTANTS, INC.

P.O. Box 7086, Dept. U 3 • Alexandria, VA 22307

Please send THE BOOK: ☐ Volume I ☐ Volume II

Name

Address

City State Zip

Enclosed is ☐ check ☐ M.O. for \$

Charge to my ☐ VISA ☐ MasterCard Bank Code

Exp. date: Card No.

Signature

VOLUME II

Packed full of useful information on the model I input/output routines, with detailed listings to illustrate the commented source code. Learn to control and manipulate the keyboard, video, printer port, and cassette port. Essential for assembly language programmers, you can write your own routines or use the many programming examples included.


```

525 REM                IF IT WAS A BACKSPACE,
THEN GET RID OF THE LAST CHARACTER
526 REM                IF THERE IS ONE
530 IF ASC(C$)=8 THEN IF LEN(IN$)>0 THE
N IN$=MID$(IN$,1,LEN(IN$)-1):PRINTC$;FN
FLD$(1);:GOTO520
535 REM                HAVE WE ALREADY GOT TOO
MANY CHARACTERS, IF SO IGNORE THE
536 REM                LAST ONE
540 IF LEN(IN$)>=ZF THEN 520
545 REM                IF WE PASS ALL THE TEST
S, ADD THE CHARACTER TO THE BUFFER
546 REM                AND PRINT IT THEN GO GE
T MORE
550 IN$=IN$+C$:PRINTC$;:GOTO520
600 REM                - - - - - SEARCH FOR
KEY - - - - -
605 REM                CL IS THE RECORD LOCATI
ON TO LOOK AT, FD IS THE FLAG THAT
606 REM                SAYS WE FOUND IT, AND L
L IS THE LAST LOCATION WE LOOKED
610 CL=2:FD=0:LL=CL
615 REM                GET THE CURRENT RECORD
& GET THE LEFT & RIGHT POINTERS
620 GET1,CL:LP=CVI(LP$):RP=CVI(RP$)

```

```

625 REM                IF WE'RE LOOKING AT THE
HEAD POINTER WHICH USES ONLY
626 REM                THE LEFT POINTER, & LP
IS 0 THEN THE LIST IS EMPTY
630 IF CL=2 AND LP=0 THEN RETURN
635 REM                IF WE'RE AT THE HEAD PO
INTER, FIND THE ROOT RECORD AND
636 REM                GO TO PROCESSING
640 IF CL=2 THEN LL=CL:CL=LP:GOTO620
645 REM                CHECK FOR THE KEY, IF I
T'S FOUND THEN SET THE FOUND)
646 REM                FLAG & RETURN
650 IF INSTR(KEY$,X$)<>0 THEN FD=1:RETU
RN
655 REM                IF WHAT WE'RE LOOKING F
OR IS LESS THEN THE KEY, SEARCH
656 REM                TH E LEFT SUB-TREE, IF
THERE IS NONE, THEN WE'RE DONE
660 IF X$<KEY$ THEN IF LP=0 THEN RETURN
ELSE LL=CL:CL=LP:GOTO620
665 REM                OTHERWISE WE SEARCH THE
RIGHT SUB-TREE UNLESS IT'S EMPTY
670 IF RP=0 THEN RETURN ELSE LL=CL:CL=R
P
680 GOTO620

```

EDAS 3.5

EDAS is a sophisticated Editor and Assembler for TRS-80 I & III

- All text may be input in upper or lower case.
- Assemble directly from one, or more disk files via *GET.
- Assemble to disk or memory
- Binary, octal, decimal, hex, and string constants; Multiple constants may be input on a single line.
- CMDFILE utility included.
- Conditional assembly support.
- Cross-Reference utility.
- DOS functions DIR, FREE, KILL, and LIST are supported.
- 14-character labels including special chars. "@", "\$", " ", "?".
- Editor includes block move, global change, rename, find.
- EDTASM & M-80 source files can be read or written.
- Expression evaluator supports +, -, *, /, MOD plus logical AND, OR, and XOR.
- Paged & titled listings with page numbers and date/time.
- PAGE, TITLE, SUBTTL, SPACE, & COM pseudo-ops supported.
- Set memory size, page prompt, JCL execution, Abort option.
- EDAS is supported with TRSDOS compatible DOSs (LDOS, VTOS).
- Price is \$79.00 + \$4.00. S&H.



MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS

LDOS, Version 5.1 is the Ultimate in Operating Systems for the TRS-80 Models I and III. MISOSYS is your East Coast Headquarters for LDOS, the documented system! Version 5.1 is priced at **\$129.00** + \$5.00 S&H per system. Deduct **\$35** if ordering both.

LOGS 5.1

DSMBLR: A 2-pass Z-80 labeling disassembler.
Output to Video, Printer, or Disk. **\$20**

DISKMOD: Turn EDTASM 1.2 into disk assembler
with block move, global change, more. **\$30**

THE BOOKS: Volume I gives access to all math
operations in Level II. Volume II explains
KI, DO, PR & Cassette I/O. Per volume: **\$15**

All programs Model I/III compatible. For S&H include \$2 + \$.50 per unit. {VA res. add 4%}



38

MISOSYS - Dept. 4U
P.O. Box 4848

Alexandria, VA 22303-0848
703-960-2998 MicroNET 70140,310
Dealers Inquiry Invited



LOS SUPPORT

CON80Z: Translates assembler source files from Intel 8080 to Zilog Z-80. **\$50**
CONVCPM: Transfers CPM files (8"-SDEN, selected 5") to LDOS diskettes. **\$30**
FED: Screen-oriented FILE "zapping" utility. **\$40**
FILTER: Application pack of 14 filter programs with assembler source. **\$60**
HELP/QRC: Very fast screen prompts for LIB, LBasic Utilities. With Quick Reference Card. **\$25**
MONITOR: Take control of I/O disk errors to attempt recovery w/o ABORT. **\$25**
LED: The LDOS ASCII/HEX word processing type editor. Edit JCL KSM FIX + **\$40**
MSP-01: This support package includes PARMDIR: a JCL file generator & report generator for DIR info; MEMDIR: produces a DIR of high memory; DOAUTO: exec any AUTO command; DDENCONF: re-initialize to a CONFIG/SYS. **\$50**
PDS: Add Partitioned Data Set functions. Directly exec CMD members. **\$40**
SOLE: Create Mod-I bootable DDEN diskettes. **\$25**
ZGRAPH: Graphic applications created on the screen with full editing. **\$40**


```

700 REM - - - - - ADD ITEM -
- - - - -
705 REM      GET SOME SPACE & THEN P
UT THE NEW ITEM THERE
710 GOSUB900:LSETKEY$=X$:LSETDT$=Y$:LSE
TLP$=MKI$(0):LSETRP$=MKI$(0)
715 REM      STORE IT
720 PUT1,LC
725 REM      GET THE RECORD THAT THI
S IS BEING ATTACHED TO & SET THE
726 REM      THE POINTERS APPROPRIAT
ELY
730 GET1,CL
740 IF CL=2 OR X$<KEY$ THEN LSET LP$=M
KI$(LC):PUT1,CL:RETURN
750 LSET RP$=MKI$(LC):PUT1,CL:RETURN
800 REM - - - - - REPLACE ITE
M - - - - -
810 LSETKEY$=X$:LSETDT$=Y$:PUT1,CL:RETU
RN
900 REM - - - - - GET SPACE F
OR AN ITEM - - - - -
905 REM      FIRST CHECK THE STACK,
IF IT'S EMPTY THEN GET SPACE AT THE
906 REM      THE END OF THE FILE ...
NOTE THE COLOR COMPUTER DOESN'T
907 REM      HAVE LOF, SO YOU'LL HAV
E TO KEEP THE LENGTH OF THE FILE IN

```

```

908 REM      THE FILE ITSELF
910 GET1,1:IF CVI(STK$(1))<=1 THEN LC=L
OF(1)+1:RETURN
915 REM      IF THE STACK ISN'T EMPT
Y, THEN GET THE TOP RECORD NUMBER
916 REM      OFF THE STACK
920 SP=CVI(STK$(1)):LC=CVI(STK$(SP)):LS
ETSTK$(1)=MKI$(SP-1)
930 RETURN
1000 REM - - - - - ADD ITEMS -
- - - - -
1005 REM      THIS IS WHERE WE ENTER
ITEMS FROM THE KEYBOARD
1006 REM      GET THE DATA
1010 ZF=36:PRINT"DATA: ";:GOSUB500:PRIN
T
1015 REM      X$ IS THE KEY, Y$ IS TH
E DATA
1020 PRINT"ADDING DATA":X$=LW$:Y$=IN$
1025 REM      SEARCH TO SEE IF THE KE
Y IS ALREADY THERE
1026 REM      IF IT IS, REPLACE THE R
ECORD, OTHERWISE ADD IT
1030 GOSUB600:IF FD=1 THEN GOSUB800 ELS
E GOSUB700
1040 RETURN
2000 REM - - - - - EDIT ITEMS -
- - - - -

```

CONVERT YOUR SERIAL PRINTER TO PARALLEL

The UPI serial printer interfaces allow an ASCII serial printer to be connected to the parallel printer port on TRS-80 Models I, II and III.

Software compatibility problems are totally eliminated because the TRS-80 "thinks" that a parallel printer has been attached. No machine language driver needs to be loaded into high memory. VISACALC, SCRIPSIT, BASIC, FORTRAN, etc. all work as if a parallel printer was in use.

The UPI interfaces are completely self contained and ready to use. A 34 conductor cable and connector plugs onto the parallel printer port of the Model I expansion interface or onto the parallel printer port on the back of Models II and III. A DB25 socket mates with the cable from your serial printer. The UPI interfaces convert the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.



BINARY DEVICES
Formerly SPEEDWAY ELECTRONICS
11560 TIMBERLAKE LANE
NOBLESVILLE, IN 46060
(317) 842-5020

39

TRS 80 is a trademark of Tandy

VISA MasterCard

Switch selectable options include:

- Linefeed after Carriage Return
- Handshake polarity (RS232-C)
- Nulls after Carriage Return
- 7 or 8 Data Bits per word
- 1 or 2 Stop Bits per word
- Parity or no parity
- ODD or EVEN parity

NEW VARIABLE BAUD RATE MODELS

Switch selectable from 110-4800 BAUD

UPI-3VB for models I or II

\$159.95

UPI-2VB for model II

\$159.95

CLOSEOUT ON SINGLE BAUD RATE MODELS

Our UPI-2 and UPI-3 will drive virtually any ASCII serial printer.

UPI-3 for model I or III

Closeout \$109.95

UPI-2 for model II

Closeout \$109.95

Specify BAUD rate 50-4800. Quantities limited.

Shipping and handling on all orders.

\$4.00

90 day warranty on all interfaces

Ten day return privilege on UPI-3VB and UPI-2VB

Longer cables available


```

2005 REM          IF THERE WAS NO KEY ON
THE COMMAND LINE, THEN ERROR
2010 IF LW$="" THEN PRINT"COMMAND ERROR
- TRY HELP":RETURN
2015 REM          SEARCH FOR THE KEY, IF
NOT FOUND THEN CAN'T EDIT
2020 X$=LW$:GOSUB600:IF FD=0 THEN PRINT
"NOT IN LIST":RETURN
2025 REM          PRINT THE DATA
2030 PRINT"DATA:
";DT$
2040 PRINT"ENTER CHANGES (ENTER IF NO C
HANGE): ";
2045 REM          GET CHANGES IF ANY, IF
JUST HIT ENTER THEN DON'T CHANGE
2046 REM          ANYTHING
2050 ZF=36:GOSUB500:PRINT:IF IN$="" THE
N RETURN
2055 REM          IF MORE THAN <ENTER> WA
S TYPED, THEN REPLACE THE RECORD
2060 Y$=IN$:X$=KEY$:GOSUB800
2070 RETURN
3000 REM - - - - - DELETE ITEMS
- - - - -
3005 REM          IF NO KEY, THEN INCORRE
CT COMMAND
3010 IF LW$="" THEN PRINT"COMMAND ERROR
- TRY HELP":RETURN

```

```

3015 REM          SEARCH FOR IT, IF IT IS
N'T THERE, WE CAN'T DELETE IT
3020 X$=LW$:GOSUB600:IF FD=0 THEN PRINT
"NOT IN LIST":RETURN
3025 REM          PRINT IT JUST TO MAKE S
URE WE REALLY WANT TO DELETE IT
3030 PRINT"KEY: ";TAB(40)KEY$
3040 PRINT"DATA: ";TAB(40)DT$
3050 PRINT"DELETE (Y/N)? ";ZF=1:GOSUB5
00:PRINT:IF IN$="N" THEN RETURN
3055 REM          ONLY IF "Y" IS ANSWERED
WILL THE RECORD BE DELETED
3060 IF IN$<>"Y" THEN 3050
3065 REM          GET THE FATHER OF THE I
TEM WE WANT TO DELETE,
3066 REM          SEE IF WE'RE DELETING T
HE LEFT OR RIGHT CHILD
3067 REM          THE SET THE CORRECT POI
NTER TO POINT TO THE LEFT SUB-TREE
3068 REM          OF THE DELETED ITEM
3070 GET1,LL:IF CL=CVI(LP$) THEN LSETLP
$=MKI$(LP) ELSE LSETRP$=MKI$(LP)
3075 REM          IF THERE'S NO RIGHT POI
NTER, THEN SIMPLY SAVE THE DELETED
3076 REM          LOCATION ON THE STACK
3080 PUT1,LL:XL=CL:CL=LP:IF RP=0 THEN 3
200

```

DISCOUNT COMPUTERS

100% RS COMPONENTS, NO FOREIGN DRIVES OR MEMORY
FULL WARRANTY

16K Color Computer	449.00	Line Printer V.....	1499.00
32K Color Computer	549.00	Line Printer VI.....	975.00
16K Model III	815.00	Line Printer VII	299.00
48K Model III, 1 Dr.....	1549.00	Line Printer VIII.....	599.00
48K Model III, 2 Dr. RS232	1889.00	Daisy Wheel II.....	1599.00
64K Model II, 1 Dr.	2920.00	1 Dr. Expansion Mod II	919.00
128K Model 16, 1 Dr.	3998.00	8.4 MEG Hard Disk Mod II/16	3685.00
128K Model 16, 2 Dr.	4598.00	All RS Software.....	20% OFF

ALL OTHER ITEMS CARRY SIMILAR DISCOUNT. CALL FOR PRICES.
CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS.
SHIPPED FREIGHT COLLECT

(817) 825-4027

40

NOCONA ELECTRONICS • Box 593 • Nocona, TX 76255


```

3085 REM      IF THE DELETED ITEM HAD
A RIGHT SUB-TREE, THEN WE'VE GOT TO
3086 REM      MOVE IT UP TO THE CORRE
CT PLACE WHICH WILL BE DOWN THE RIGHT
3087 REM      SUB-TREE OF THE LEFT-SU
B-TREE OF THE DELETED ITEM
3088 REM      TRY THIS ONE BY HAND TO
SEE HOW IT WORKS
3090 GET1,CL:IF CVI(RP$)=0 THEN LSETRP$
=MKIS(RP):PUT1,CL:GOTO3200
3095 REM      MOVE DOWN THE RIGHT SUB
-TREE
3100 CL=CVI(RP$):GOTO3090
3200 REM      PUSH OPEN SPACE ON STACK
3210 GET1,L:SP=CVI(STK$(1))
3215 REM      ARBITRARILY IGNORE MORE
THAN 30 DELETED ITEMS
3220 IF SP>=30 THEN PRINT"STACK FULL":R
ETURN
3225 REM      STACK THE DELETED RECOR
D NUMBER
3230 SP=SP+1:LSETSTK$(SP)=MKIS(XL):LSET
STK$(1)=MKIS(SP)
3240 PUT1,L:RETURN

```

```

4000 REM - - - - - PRINT LIST -
- - - - -
4005 REM      LOOK FOR LEGAL COMMANDS
FULL OR ORDERED
4010 IF LW$="FULL" THEN 4100
4020 IF LW$="ORDERED" THEN 4200
4030 PRINT"COMMAND ERROR - TRY HELP":RE
TURN
4100 REM - - - - - PRINT ITEM
S - - - - -
4105 REM      FULL OPTION TO PRINT, C
HECK TO MAKE SURE THERE IS
4106 REM      OTHERWISE PRINT THE HEA
DING
4110 IF LOF(1)<=2 THEN RETURN ELSE PRIN
T"      KEY","LEFT PTR","RIGHT PTR","DAT
A"
4115 REM      LOOP OVER ALL AVAILABLE
RECORDS
4120 FOR I=3 TO LOF(1)
4125 REM      GET EACH RECORD AND PRI
NT IT'S NUMBER
4130 GET1,L:PRINTUSING"###: ";I;
4135 REM      PRINT ALL THE DATA, KEY
, LEFT POINTER, RIGHT POINTER, AND

```

Marymae INDUSTRIES, INC.

In Texas, Orders,
Questions & Answers
1-713-392-0747

22511 Katy Freeway
Katy (Houston), Texas 77450

To Order
1-800-231-3680
800-231-3681

SAVE BIG DOLLARS ON ALL TRS-80® HARDWARE & SOFTWARE

TRS-80® by Radio Shack. Brand new in cartons delivered. Save state sales tax. Texas residents, add only 5% sales tax. Open Mon-Sat. 9-6. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

WE OFFER ON REQUEST

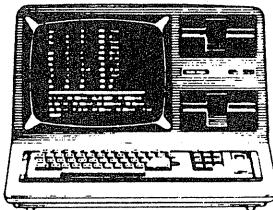
Federal Express (overnight delivery) ☒

Houston Intercontinental Airport
Delivery, Same Day Service ☒

U.P.S. BLUE—Every Day ☒

References from people who have
bought computers from us probably
in your city. We have thousands
of satisfied customers. WE WILL
NOT BE UNDERSOLD!

ED McMANUS



In stock TRS-80 Model
II and III

☒ No Tax on Out of Texas Shipments!
41

**Save
10% 15%
OR MORE**

Reserve your Model 16 Today!
TELEX: 77-4132 (FLEXS HOU)

WE ALWAYS OFFER

- ☒ NO extra charge for Master Card or Visa
- ☒ We use Direct Freight lines. No long waits
- ☒ We always pay the freight and insurance
- ☒ Toll free order number
- ☒ Our capability to go to the giant TRS-80® Computer warehouse 5 hours away, in Ft. Worth, Texas, to keep *you* in stock.

® TRS-80 is a Registered Trademark of Tandy Corp.

JOE McMANUS




```

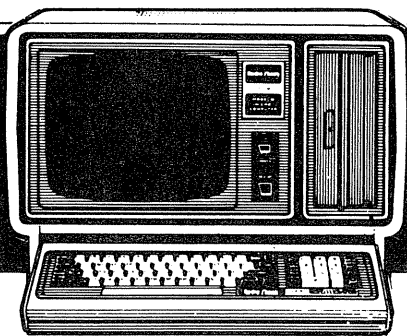
4136 REM      DATA, ONLY PRINT THE FI
RST PART OF KEY AND DATA
4140 PRINT MID$(KEY$,1,10),CVI(LP$),
CVI(RP$),MID$(DT$,1,10)
4150 NEXT I
4160 RETURN
4200 REM - - - - - PRINT ITEMS IN
KEY ORDER - - - - -
4205 REM      THIS IS A SORTED ORDER
PRINT WHICH COMES FROM RECURSIVELY
4236 REM      FOLLOWING THE TREE DOWN
AND THEN BACK UP AS DISCUSSED
4207 REM      IN THE ARTICLE ON RECUR
SIVE PROCEDURES, THIS ONE HAS BEEN
4238 REM      ADAPTED TO CONVERT THE
RECURSIVE CALLS INTO SIMPLE GOTO'S
4209 REM      MAKING IT TECHNICALLY N
OT RECURSIVE ANYMORE
4210 SP=0:CL=2:PRINT"      KEY",,"DATA"
4215 REM      GET THE CURRENT RECORD
AND IT'S POINTERS
4220 GET1,CL:LP=CVI(LP$):RP=CVI(RP$)
4225 REM      IF THE TREE IS EMPTY, W
E'RE DONE

```

```

4230 IF CL=2 AND LP=0 THEN RETURN
4235 REM      IF WE'RE AT THE HEAD RE
CORD, FIND THE ROOT
4240 IF CL=2 THEN CL=LP:GOTO4220
4245 REM      IF THE LEFT POINTER ISN
'T ZERO, STACK THE CURRENT RECORD
4246 REM      AND GO BACK FOR THE LEF
T SUB-TREE
4250 IF LP<>0 THEN SP=SP+1:STK(SP)=CL:C
L=LP:GOTO4220
4255 REM      WHEN WE FINALLY GET A Z
ERO LEFT POINTER, PRINT THE DATA
4256 REM      RECORD WE'RE CURRENTLY
LOOKING AT
4260 PRINTUSING"###: ";CL;
4270 PRINTKEY$,DT$
4275 REM      IF THE RIGHT POINTER IS
N'T ZERO, THEN STACK THE CURRENT
4276 REM      RECORD NUMBER (NEGATIVE
SO WE KNOW WE'RE DOING IT FOR A
4277 REM      RIGHT SUB-TREE TRAVERSA
L) AND THEN GO BACK AND GET THE
4278 REM      RIGHT SUB-TREE
4280 IF RP<>0 THEN SP=SP+1:STK(SP)=-CL:
CL=RP:GOTO4220

```



TRS-80 MODEL II 64-K \$3279
26-4002

TRS-80 MODEL 16 128-K \$4925
26-6002

8.4 MEGABYTE HARD DISKS (PRIMARY UNIT) \$4000.

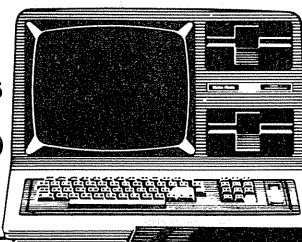
WE ALSO CARRY EPSON AND OKIDATA
PRINTERS, XEROX 820 AND
ALTOS COMPUTERS.
NO OUT-OF-STATE TAXES.

Sold with the manufacturer's limited warranty. Copies
of such warranty may be obtained for review from
Perry Oil and Gas Co.

42

TRS-80®

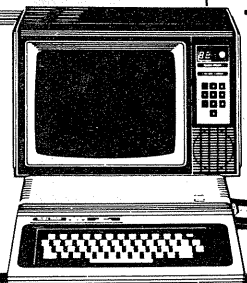
DISCOUNT



TRS-80 MODEL III

48-K \$2049 16-K \$819
26-1066 26-1062

WITH 2 DISK RS-232 TAPE VERSION
(ALL RADIO SHACK EQUIPMENT)



TRS-80 COLOR 4-K \$309
26-3001

16-K \$455 32-K \$525
26-3002 26-3003

COLOR DISK DRIVES

0- \$475 1-2-3- \$315

— T.M. TANDY CORP.

DEALERS' INQUIRIES INVITED.

WE ACCEPT
CERTIFIED CHECKS,
CASHIERS CHECKS
AND MONEY ORDERS.

PERRY OIL & GAS INCORPORATED

Dept. No. C-3 137 NORTH MAIN ST., PERRY, MICHIGAN 48872

PHONE (517) 625-4161, MICH.

FOR OUR PRICES, PLEASE CALL TOLL FREE **1-800-248-3823**


```

4285 REM      WHEN THE RIGHT SUB-TREE
      IS DONE, THEN WE'RE DONE IF THERE IS
4286 REM      NOTHING LEFT ON THE STA
      CK
4290 IF SP=0 THEN RETURN
4295 REM      OTHERWISE, GET THE TOP
      FROM THE STACK, IF IT'S FROM A LEFT
4296 REM      TRAVERSAL THEN WE GET T
      HE NEW CURRENT RECORD AND PRINT IT
4300 SP=SP-1:CL=ABS(STK(SP+1))
4310 IF STK(SP+1)>0 THEN GET1,CL:LP=CVI
      (LP$):RP=CVI(RP$):GOTO4260
4315 REM      OTHERWISE UNSTACK ANOTH
      ER ITEM
4320 GOTO4290
5000 REM      - - - - - HELP - - - - -
      - - - - -
5010 PRINT:PRINTTAB(10)"COMMANDS"
5020 PRINTTAB(15)"ADD <KEY>";TAB(40)"AD
      D AN ITEM"
5030 PRINTTAB(15)"EDIT <KEY>";TAB(40)"E
      DIT AN ITEM"
5040 PRINTTAB(15)"DELETE <KEY>";TAB(40)
      "DELETE AN ITEM"

```

```

5050 PRINTTAB(15)"PRINT FULL";TAB(40)"P
      RINT FULL FILE INFORMATION"
5055 PRINTTAB(15)"PRINT ORDERED";TAB(40)
      )"PRINT KEY ORDERED LIST"
5060 PRINTTAB(15)"HELP";TAB(40)"PRINT T
      HIS LIST"
5070 PRINTTAB(15)"END";TAB(40)"END OF P
      ROGRAM"
5080 PRINT:PRINT
5090 RETURN

```

Listing 2

```

10 REM *****
20 REM
30 REM TOWERS OF HANOI
40 REM DEMO OF RECURSION IN BASIC
50 REM TERRY R. DETTMANN
60 REM
70 REM VERSION 1.0 05/01/82
80 REM
90 REM *****
100 CLEAR1000:DEFINT A-Z
110 MX=25:DIM STK(25,4),TWR(10,3),TP(3)
      ,LB$(4)
120 SP=0:BL$=STRING$(20," ")

```

MOD I/III SPEED MOD

The only resource you can't replace is TIME. PLUG IN A SPRINTER (by Holmes Engineering) and

TRIPLE THE SPEED of your TRS-80 MODEL I OR MODEL 3.

YES! A NEW Z-80B MICROPROCESSOR IS INCLUDED!

YES! Special circuitry handles your slower memory chips.

YES! Automatic switch down to "normal" for disk I/O.

YES! IT IS ABSOLUTELY FANTASTIC and only 99.50 COMPLETE!!

Only the cream of the crop - - for you, from HACKS.

SCRIPUS v3.0 (by ROSTEK) is the software "patch" for SCRIPSIT (c) that lets you output control codes to CHANGE TYPE STYLES, UNDERLINE, etc. from within your text files. Written especially for the MX-80 but works fine with most any printer that accepts control codes. Makes your printer do all the tricks it was designed for. +DIR, KILL, MERGE, and MORE, WHILE IN SCRIPSIT (c).

How many times have you wished? Here 'tix ON DISK 39.95

Need a SUPERFINE lowercase CHARACTER GENERATOR for your MOD 1? KSG Technology builds 'em, and we've got one just for you. Beautiful lowercase -FULL DECENDERS - All of the graphics, of course. INCLUDES the SPECIAL GRAPHICS for CHRS(0) thru CHRS(31) omitted in the later Radio Shack lower case chips. Ask for the CGA-2. You'll love it! Only 29.95

Did you ever bomb a disk? SUPER UTILITY (by Kim Watt) WILL AUTOMATICALLY RECOVER BOOT SECTIONS, GAT TABLES, READ AND COPY PROTECTED MEDIA, TRANSFER FROM ONE DOS to ANOTHER, SINGLE OR DOUBLE DENSITY, and on, and on, and on . . . You just wouldn't believe . . . Includes a hundred and some odd vital functions. The BEST (no doubt!) and very, very highly recommended for ANYONE that uses a TRS-80 MOD 1 or MOD 3 with any kind of DISK and any kind of DOS. You just got to use it to realize what you've got here! The name "SUPER UTILITY" is a gross understatement. One use can easily pay for the program. 48K required. Specify 35tk, 40tk or 80 tk media for your Mod 1 or Mod 3. Absolutely professional! You need this! Don't get caught without it. 74.95

ALL HARDWARE Model I Lowercase

TRS-80 is a Trademark of Tandy Corp

DUALCASE

UPPER/lowercase, full time from power-up; NO software; Standard typewriter keyboard operation (shift to UPPER-CASE); Control characters can be displayed; 128 Total character set plus full graphics.

ELECTRONIC SHIFT-LOCK

No extra keys or switches. Simply tap either shift key, UPPER-CASE lock, normal shift unlocks.

DE-B-B-BOUNCE At no extra cost (At your option)

BLOCK CURSOR If you like (No chg) **SWITCHABLE** from key board

"THE PATCH" is compatible with any word processor, any DOS and also other languages which use ROM sub-routines. Assembled and tested..\$127.00

"THE PATCH" unit plugs into the ROM sockets (does not replace existing ROM). Lowercase does require installation of the extra video ROM (supplied with "THE PATCH").

Detailed instructions guide even the most inexperienced owner to complete installation in about 30 minutes.

WHEN ORDERING SPECIFY:

"Mem Size" ☐ "Memory Size" ☐
And your choice of any/all options.

To order, send payment plus \$2.00 shipping and handling. Texas residents add 5% sales tax/

WHEN ORDERING SPECIFY:

"Mem Size" ☐ "Memory Size" ☐
Any your choice of any/all options

To order, send payment plus \$2.00 shipping and handling. Texas residents add 5% sales tax.



"THE PATCH" is covered with a one year limited warranty on materials and workmanship. (Does void Radio Shack's 90 day warranty.)

"THE PATCH" is a trademark of CECDAT, INC.

HACKS

P.O. BOX 12963
Houston, Texas 77017

43

National Distributors

713-455-3276


```

130 FORI=1TO4:READLB$(I):NEXTI
140 DATA N, FROM, TO, TEMP
150 DEF FNDSK$(N)=STRING$(10-N, 32)+$PRI
NG$(N, 153)+CHR$(155)+STRING$(N, 153)
160 DEF FMNDSK$(N)=STRING$(10, 32)+CHR$(
155)+STRING$(10, 32)
200 REM - - - - - COMMANDS - -
- - - - -
210 CLS:PRINT"TOWERS OF HANOI":INPUT"HO
W MANY DISKS (1-10)";N:IF N>10 OR N<1 T
HEN 210
220 NUM=0:EX=2^N-1:FRM=1:TT=2:TMP=3:PRI
NTCHR$(2)
230 GOSUB9000:GOSUB1200
240 GOSUB1000
250 PRINT@(23,0),,:INPUT"AGAIN (Y/N)";Y
N$:IF YN$="Y" THEN 200 ELSE IF YN$<>"N"
THEN 250
260 END
9000 REM - - - - - INITIALIZE N
TOWERS - - - - -
910 FORI=1TON:TWR(I,1)=N-I+1:TWR(I,2)=0
:TWR(I,3)=0:NEXTI
915 IF N<10 THEN FORI=N+1TO10:FORJ=1TO3
:TWR(I,J)=0:NEXTJ:NEXTI

```

```

920 TP(1)=N:TP(2)=0:TP(3)=0
930 RETURN
1000 REM - - - - - MOVE N TOWER
S - - - - -
1010 IF N>1 THEN GOSUB2000:N=N-1:FRM=FR
M:TT=TP:TP=TMP:TMP=T:GOSUB1000
1020 GOSUB1100:GOSUB1305
1030 IF N>1 THEN GOSUB2000:N=N-1:T=FRM:
FRM=TMP:TT=TP:TMP=T:GOSUB1000
1040 GOSUB2100
1050 RETURN
1100 REM - - - - - MOVE ONE DIS
K - - - - -
1110 T=TWR(TP(FRM), FRM):TWR(TP(FRM), FRM
)=0:TP(FRM)=TP(FRM)-1
1120 TP(TT)=TP(TT)+1:TWR(TP(TT), TT)=T
1125 NUM=NUM+1
1130 RETURN
1200 REM - - - - - PRINT TOWERS -
- - - - -
1210 FORJ=1TO3:CL=(J-1)*25
1220 PRINT@(10,CL),USING"TOWER #";J
;
1230 FOR I = 10 TO 1 STEP -1:RW=10+1
0-I+1


```

GEAP DOT WRITER

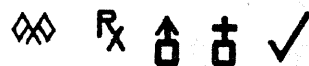
Another **GEAP** expansion module for Epson Graftrax Owners

FEATURES: GEAP CHARACTER FONTS • Create High Res Drawings without TRS-80 modifications or programming knowledge • Create or modify fonts • Print time options such as magnify, dot, spacing control, reverse and more • Library function allows saving to disk printing or re-editing.

ACTUAL CHARACTER FONTS / SIZE

NOTICE  **ABCD** **ABCD**
ABCD **ABCD**
abcd **ABCDE**
ABCD **abcd**
AB C D E F

**SAMPLES - High Res
and Modified Characters**



GEAP is modular in form. We have a package for just about every system. If you don't see components for your system, call us; we probably didn't have room to list it.

16 - 48K SYSTEMS - CASSETTE - DISK - OR STRINGY

GEAP 1.3 \$25.99 - The famous **GEAP** editor; draw, rotate, magnify, "paintbrush" merge, write basic program - just a few of the options.

Here is what the reviewers have said about **GEAP 1.3**:

"I have seen other programs that claim to do what **GEAP** does, but no other has lived up to my expectations" - Richard McGarvey, 80 Microcomputing, March 1982, p. 57

"Of all the TRS-80 programs that have passed my way, none has exceeded my expectations as this one has. **GRAPHICS EDITOR AND PROGRAMMER** by Bill Mason" - Margaret M. Grothman (Softside Magazine, Jan. 1982)

44

EXPANSION MODULES 1-5 \$16.99. More magnify, rotation and other commands, "INSTANT BLOCK" letters to speed up your drawing. Magnification allows manipulation of the Instant Letters, giving you many variations.

48K SYSTEMS

GEAP 2.1 \$45.95. A special enlarged **GEAP 1.3** Editor plus over 10 **GEAP** Expansion Modules. Instant Letters, EPSON/OKIDATA Block "block graphics" support. Quickcursor module with 2 speed controllable cursors, rectangle, line and circle commands. 2.1 also includes the NEWSRIP interactive module. (For other printer support - call)

GEAP DOT WRITER - You get all of the 2.1 Package plus all of the Dot Writer's high resolution capabilities. With this package you enter a new world. (Epson Printer Support only at this time).

\$75.95

MOD 1/111

J F CONSULTING / 74355 BUTTONWOOD / PALM DESERT, CA 92260 / (714) 340-5471

MC/VISA

A Pot Of Gold For YOUR Color Computer

"I buy practically every computer magazine there is, but the **RAINBOW** is the only one I read cover-to-cover as soon as it comes in the mail." — A subscriber

The **RAINBOW** gets that sort of response for more reasons than one — but the primary one is simply it is the premier magazine for TRS-80® Color Computer users. And because it devotes every page of each monthly issue exclusively to the Color Computer, it is the single best source of information for everything you want to know.

Tired of trying to convert other computer programs to your Color Computer? No worries. Each program in the **RAINBOW** is written exclusively for your computer — and many take advantage of all the excellent graphics commands unavailable on other machines! The nation's leading software authors have contributions every month.

The **RAINBOW**'s Hints, Tips and Pipeline feature give you the best up-to-the-minute information available on the Color Computer. If you are looking for ways to do screen prints, alphabetize disk directories, save machine language programs or print Videotex input on your printer, the **RAINBOW** has programs for you! And if you want to know when some promised software will really be available for purchase, you'll get that answered, too.

Our tutorials have been praised for the clear, concise way they explain — in detail — various functions of the Color Computer. And the **RAINBOW**'s reviews are an excellent and honest buyer's guide to software and other purchases.

Whether your Color Computer is 4K, 16K or 32K. Whether you have Color Basic or Extended. Whether you're into assembly language (or want to get into it) or not. Printers. Disks. Rom packs. The **RAINBOW** surveys the whole world of the Color Computer each month and provides what one reader called "A pot of gold full of fabulous information."

Because it is journalistically-oriented, the **RAINBOW** gives fast turnaround to meet its monthly deadline. So you can expect fresh news when it is news and the latest information available.

If all this sounds like a lot for \$16 per year, it may be. But we'll make one more promise. If after you see your first issue you don't agree that the **RAINBOW** is the premier monthly magazine for Color Computer users, we'll happily, cheerfully and immediately refund your money.

Trademark of Tandy Corp.



the **RAINBOW**
5803 Timber Ridge Drive P.O. Box 209
Prospect, KY 40059

(502) 228-4492

Gentlemen: YES! Sign me up right away for a one-year (12 issues) subscription to the **RAINBOW**. My payment is enclosed.

Name _____

Address _____

City _____ State _____ Zip _____

Payment Enclosed

Charge my VISA # _____

Charge my MasterCard # _____

Signature _____

Card Exp. Date _____

Interbank # _____

45

Subscription price: \$16 per year in the U.S., Canada and Mexico; \$22 per year outside the U.S. Payment in U.S. dollars only. Payment in U.S. dollars only. Payment in U.S. dollars only. Payment in U.S. dollars only.



Files

```
1240 IF TWR(I,J)=0 THEN PRINT@ (RW,CL),FN NDSK$(0); ELSE PRINT@ (RW,CL),FN DSK$(TWR(I,J));
```

```
1250 NEXT I
```

```
1260 NEXT J
```

```
1270 RETURN
```

```
1305 REM - - - - BLANK FROM, ADD TO - -
```

```
1310 RW=10+10-TP(FRM):CL=(FRM-1)*25
```

```
1320 PRINT@ (RW,CL),FN NDSK$(0);
```

```
1330 RW=10+10-TP(TT)+1:CL=(TT-1)*25
```

```
1340 PRINT@ (RW,CL),FN DSK$(TWR(TP(TT),TT));
```

```
1350 RETURN
```

```
2000 REM - - - - - PUSH PARAMETER  
S ON THE STACK - - - - -
```

```
2010 IF SP>=MX THEN PRINT"ERROR - STACK  
FULL":END
```

```
2020 SP=SP+1:STK(SP,1)=N:STK(SP,2)=FRM:  
STK(SP,3)=TT:STK(SP,4)=TMP
```

```
2030 RETURN
```

```
2100 REM - - - - - POP PARAMETERS  
OFF THE STACK - - - - -
```

```
2110 IF SP<=0 THEN RETURN
```

```
2120 N=STK(SP,1):FRM=STK(SP,2):TT=STK(S  
P,3):TMP=STK(SP,4)
```

```
2130 SP=SP-1:RETURN
```

MARATHON 
SOFTWARE

PIK'EM

1982



**64%
ACCURATE**
AGAINST
POINTSREAD
FOR 1981
SEASON
(Games 2-16)

A COMPLETE FOOTBALL PREDICTION PROGRAM FOR THE
1982 NFL PROFESSIONAL REGULAR SEASON STARTING SEPT. 12, 1982*

★ ★ ★ ★ ★

ONLY 20 MIN. DATA INPUT PER WEEK WILL GIVE YOU THE EDGE ON EVERYONE**

CAN BE UPDATED FOR 1983



PHONE
LINES
OPEN



24-HOURS — 7-DAYS

NAME _____
ADDRESS _____
CITY _____ ST _____ ZIP _____
PIKEM 24⁹⁵ PAYMENT ENCL ☐
VISA ☐ MASTERCHARGE ☐ AC# _____
MY CARD EXPIRES: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

\$24⁹⁵ INCLUDES:
DATA DISKETTE
COMPLETE INSTRUCTIONS
SPECIFY:

TRS80 MODEL I/III
AT LEAST 32K

DATA NEEDED TO RUN PROGRAM
AVAILABLE IN LOCAL NEWSPAPERS.

DEALER INQUIRIES INVITED

46

STAT SERVICE AVAILABLE
FOR ALL 16 WEEKS OF SEASON

—FEATURES—

- DISPLAYS PREDICTED SCORES 210 GAMES
- DISPLAYS ACCUMULATED STATS EACH TEAM
- DISPLAYS AVERAGE STATS EACH TEAM
- GIVES PRINTOUT: PREDICTIONS—STATS—AVE
- AUTOMATICALLY STORES DATA — NO 'SAVE'

* IF PROGRAM IS BOUGHT AFTER SEASON STARTS — ALL PREVIOUS STATISTICS WILL BE INCLUDED — NO CHARGE.

FOR MORE INFORMATION CONTACT:

MARATHON SOFTWARE DEPT. U
P.O. BOX 1493
JACKSONVILLE, TEXAS 75766
(214) 586-8212

Tandy topics

Ed Juge, Director, Computer Merchandising
1500 One Tandy Center, Fort Worth, TX 76102

Last month (May) was a blur! I was buried in catalog work, travel, a conference in New York, N.C.C. in Houston, and a few other time-consumers. I am sorry Tandy Topics was missing from the August issue. It was my fault, and I'll try not to let it happen too often.

My travels provided my first chance at fairly serious (business use) programming on the new Pocket Computer PC-2. Wow! I'm impressed! If you haven't seen one, go look.

For those of you who have a PC-2, I have three bits of information. First, a command was inadvertently omitted from the owner's manual. When dimensioning string arrays, PC-2 has the capability to assign the exact number of storage locations required for the array. It was not explained. The form of the declaration is:

DIM name (size)*length

"Name" is a standard allowed array name. "Size" is the maximum number of array elements, from zero to 255. Remember, you'll get one more than specified. "Length" is an optional length of each string (1 to 80 characters), and defaults to 16 if not specified. DIM NA\$(12)*20, for example, creates an array named NA\$, which can have subscripts from zero to 12 (thirteen elements in the array), and strings can be up to 20 characters long.

The second thing concerns commands specific to the printer. If you detach the PC-2 from the printer and list the program, you get a tilde ("squiggle" to those who didn't take

high school Spanish) in place of all printer/plotter commands. Reason: They are contained in ROM in the printer, not the PC-2, so the PC-2 can't convert the compressed command back into the real command for listing. So don't do what I did the first time, and retype all those commands again... they are still there.

Third, there is a mandatory power-up procedure, when you've inserted batteries or pressed the LL RESET switch. It's simple:

- 1) Turn the PC-2 on. It should say NEW0:CHECK.
- 2) Press CLEAR.
- 3) Be sure you're in PROgram mode (Use MODE key).
- 4) Type NEW0 and press ENTER.
- 5) Press SHIFT MODE to go to RESERVE mode.
- 6) Type NEW and press ENTER.

This resets all pointers and readies the PC-2 for work. Why? Because on power-up, internal pointers need to be reset, or the PC-2 may think it has zero memory.

PC-2 is really an amazing computer — next best thing to carrying a Model III in your pocket! Of course, I've watched it being developed, reviewed hardware and language specifications, physical design — the whole thing, but actually working with one was a real pleasure. I hope you'll be as impressed with it as I was.

Hard Disk Owners

TRSDOS 4.1 (our new hard disk operating system which is compatible with slim-line or

standard floppy drives) and its final hard disk owner's manual, are now available. If you have purchased a hard disk, and sent in your registration card from the temporary manual, you should now have yours. A letter went out to all owners of record.

Model 16 Multi-User System

It appears we've overestimated the number of hours in our engineers' days. I told you in July about the delay in Arcnet. Well, we're going to have to slip the Model 16 multi-user operating system around to the first quarter of 1983, too. Development teams are (and have been) working on both projects, but there weren't enough people available to hold the original expected dates. We apologize, and will attempt to keep you up to date.

New Radio Shack Catalog

The new 1983 Radio Shack catalog will be available in our stores during the first days of September. You'll find computers on the last 12 pages and the back cover. There are some major new hardware items and lots of new software listed. Be sure to pick one up at your nearest outlet.

In July, I told you Model III Super Scripsit would be out in June, and Profile III Plus in late July. An obscure bug or two in Scripsit took longer to find than expected, causing about a two-month slip. Profile III Plus was also delayed, but should be showing up about the time you read this. Murphy said it: "Anything that can go wrong, will!" See you next month. ■

Pie charts

As easy as 3.141592654 . . .

Model I/III, tape or disk, printer optional

The use of graphic aids in presentations and reports enhances the message to be delivered. The time that has to be invested in the production of these is often so high that people shy away from the task and use few (or no) graphics with the material documentation. For these reasons, throughout the history of computing, several pieces of hardware and software have been developed for relatively easy production of graphics with the help of computerized tools.

Video screens and slow printers may be effectively used for this task. The straightforward, initial applications one sees in this field are the graphs of single value functions (as in a series of characters on the printer paper) with, perhaps, coordinates drawn and coordinate marks and labels. Further on, one sees more full graphics with histograms and bar charts, very useful for examining and analyzing experimental frequency distributions. Finally, one sees circles.

There is a special case of the circle (with some additional stuff) that is very popular in presentations: the pie chart. The pie chart is another way to graphically represent a frequency distribution. One usually finds colored or shaded versions of these, and when there are not too many "pieces of pie," it really drives home strong statistics. A pie chart is a circle in which a number of lines project radially from the center. These lines divide the circle into segments. The area of each segment is proportional to the relative percent that piece of circle represents in the frequency distribution.

One could see this proportionality in a different way. In general, if one has a proportion p (where $0 < p < 1$) of the circle to represent, the angle formed by the two straight line segments is $360 \times p$ degrees.

Difficulties in Drawing Lines

The main difficulty in drawing any line is distortion. Probably all of us have sent the image we had on the screen to the printer—maybe a graphic image that really impressed us. That's why we wanted a hard copy in the first place. If the image we have on the screen is a circle, it comes out on the printer as a very flat ellipse! This phenomenon happens, not only with curvilinear figures such as circles, parabolas, ellipses and hyperbolae; but also with straight lines. With lines, we don't notice too much distortion. If you make a 45-degree line on the screen and output to the printer, it still looks straight, yet it is no longer a 45-degree line.

What we wish to do is to transform a graphic pattern without distorting it. Think of a straight line equation, multiply everything by the same factor and maybe add

Jose Babilonia, Rio Piedras, Puerto Rico

a constant to everything. If you are familiar with algebra, you know this is called a linear transformation.

We want to make a linear transformation on the circle so that it looks like a circle, no matter which computer medium was used.

With the line, there are milder problems that have to be solved. A linear transformation on the equation of a straight line will retain the same slope it started with. A second problem is that, once we have figured out where our circle is to be, we must make sure that the line passes exactly through its center. A third problem is that we don't want to draw the whole line, but only a piece of it—one that connects the center of the circle with the correct point on the periphery of the circle.

Algebra and Trigonometry

In Figure 1, lx is the horizontal axis (marked out in inches), ly is the vertical axis (also marked out in inches), and r is the radius of the circle (in inches). The equation for a circle of radius r , with center a inches from the ly axis and b inches from the lx axis is, using TRS-80 BASIC notation:

$$(1) \quad (lx-a)^2 + (ly-b)^2 = r^2$$

Unfortunately, the units of measurement available to us on the printer are not inches but specific points on the line, separated at regular intervals. The lines are spaced at specific regular intervals. On an Okidata Microliner-80, one can print characters on the line at densities of 5, 10 or 16.5 characters per inch; and print these lines at densities of 6 or 8 lines per inch. Given the printing parameters, we would like our circle to come out as a circle every time.

Let's call xf the horizontal printing density and yf the vertical printing density. If nry are the number of vertical lines that correspond to r inches, nx the number of horizontal points that correspond to lx inches, ny the number of lines that correspond to ly inches, nax the number of horizontal points that correspond to a inches, and nby to the number of lines that correspond to b inches, the following relations are straightforward:

$$(2) \quad \begin{array}{ll} lx * xf = nx & ly * yf = ny \\ a * xf = nax & b * yf = nby \end{array}$$

$$r * yf = nry$$

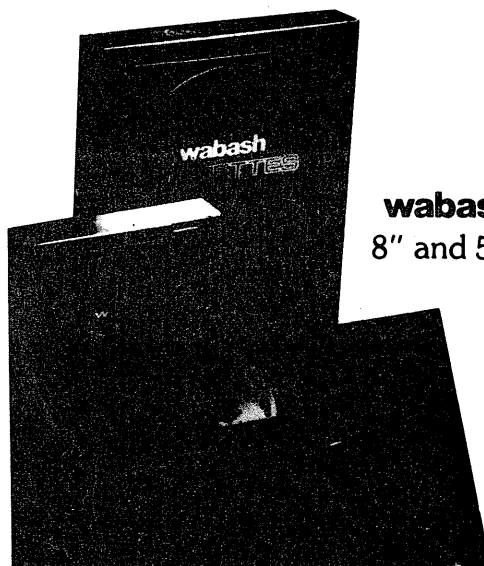
The equation for the circle (1) can be expressed (instead of in inches) in our available units by using the simple relations above (2).

$$(3) \quad ((nx-nax)/xf)^2 + ((ny-nby)/yf)^2 = (nry/yf)^2$$

With simple algebraic manipulations, we can solve for nx and get:

$$(4) \quad nx = xf * (a \pm \text{SQR}(r^2 - (ny/yf-b)^2))$$

Announcing the best Error Free Personal Computer Diskette Money can Buy. For Less.



wabash
8" and 5 1/4"

- Error Free
- 1 year warranty
- Hub ring installed
- Write/Protect notch
- Next day delivery

\$19.90/box of 10

- No minimum order quantity

If you are a member of a user group or a school district please call for special terms on future offers. **TSS** is the largest specialty supplier of magnetic media in the Midwest. We have the products that you want when you need them. Please take advantage of this introductory offer and call us **now**.



**Transaction
Storage Systems, Inc.**
MAGNETIC MEDIA SPECIALISTS

22255 Greenfield Road
Southfield, MI 48075

CALL TOLL FREE

1-800-521-5700

1-800-482-4770 (Michigan)

313-557-3036 (Detroit)

312-922-0076 (Chicago)

614-221-1788 (Columbus)

513-621-1518 (Cincinnati)

Telex 810-224-4646

EXPECT A MIRACLE

47

YES, **TSS** is the magnetic media supplier that I have always wanted.

Please send me _____, _____, @ _____ ea.
Quantity Description Price

I am interested. Please send me more information
or call me at () _____

For faster order entry call any of our toll free or local numbers

Name _____ Title _____

Company _____

Address _____


City _____ State _____ Zip _____

Purchase order number _____

Amex/Master Card/Visa orders are accepted

Expiration Date

month _____ year _____



IS THIS YOUR CUSTOMER?


When your customer needs you, he needs you NOW! Why make him search through a ton of local phone books or back issues of magazines for your number?

THE COMPUTERIST'S DIRECTORY YELLOW PAGES are the one quick reference to your products or services for the personal and small business computerist. Hardware, software, services, supplies and much more are conveniently indexed and cross referenced, placing your company on your customer's desk six months at a time. Now you can have inexpensive advertising insurance assuring that once your product announcement and ads have made their impression, your customers will be able to find you when they are ready to buy!

THE COMPUTERIST'S DIRECTORY WHITE PAGES are the first attempt by any publication to catalog the individuals and groups that are creating the Information Revolution. The White Pages contain listings by individuals, clubs, user groups, computerized bulletin boards and professional associations. Many listings also include network I.D. numbers (Source, CompuServe, etc.) making the Computerist's Directory a pioneer in facilitating Electronic Mail & Conferencing.

One Computerist's Directory is worth a room full of local phone directories.

HE ONLY HAD TO LOOK IN ONE PLACE!

the Computerist's Directory  The National Phone Book of Computing

PO BOX 405 (707) 887-1857
FORESTVILLE, CA 95436

48

Pie charts

where we changed back to a and r , since that is what the user will enter in inches. No matter how we set up the printer, this equation gives the linear transformation of the original so that its form and internal proportions are preserved.

The straight line equation and its treatment are very similar. Using the same notation and looking at Figure 2, the equation of a line that passes through point (a,b) , with slope β , is:

$$(5) \quad (ly - b) = \beta * (lx - a)$$

Solving for lx :

$$(6) \quad lx = a + (ly - b)/\beta$$

Using the equations relating lx to nx , and ly to ny (2), the equation is transformed to:

$$(7) \quad nx/xf = a + (ny/yf - b)/\beta$$

Since β is the slope, we can substitute $TAN(\theta)$, where θ is the angle between the horizontal axis and the straight line. Making that substitution and solving for nx , the equation for the line becomes:

$$(8) \quad nx = xf * (a + (ny/yf - b)/TAN(\theta))$$

This equation is also free of the first two problems that were discussed previously in relation to the line.

The reason we are solving for x (or for nx), is that in the program, the independent variable is ly (or ny). These two equations, (4) for nx (circle), and (8) for nx (line), are the ones that are to be used in the program.

The Product of the Program

After all of the conversational song-and-dance where the user provides information, the program displays a segmented circle or pie chart. After striking any key, the program produces a new screen with two lines of a descriptive title and data corresponding to the segments the user supplied.

On the printer, the program gives the user a chance to align the page and prints the two lines of user-supplied title. This is followed by the pie chart drawn with a user-specified keyboard character, and by user-supplied labels and percentages of each segment of the pie.

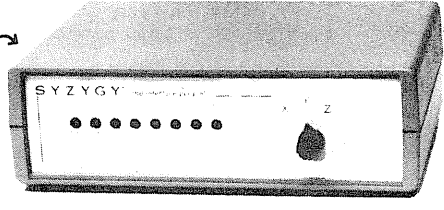
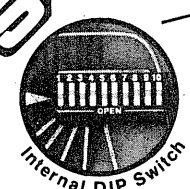
The user must supply printer parameters: size and position of the circle, number and proportion of each segment or pie piece, heading labels, and segment labels. The information to be entered is as follows:

- Description or title of the pie chart.
- Number of segments.
- Description or label of each of the segments.
- Video or printer output.
- Position of the center of the circle relative to the left and top edges of the screen or paper. For the printer, the answers must be in inches. For the screen, there are special instructions. If a part of the circle, or one of the radial lines, does not fall within the physical boundaries, there is no problem. You will see only the part of the figure that can be drawn.
- Enter the proportion, or fraction of the pie, that a segment is to cover. The last segment is computed automatically. Each of the quantities must be larger than zero and less than one. The algorithm checks whether the sum of fractions is less than one.
- Select the character to be used by the printer. Screen graphics are drawn with SET(x,y).
- Physical parameters for the printer: horizontal

A NEW PRODUCT FROM SYZYGY™
"the interface people"

Introducing the...
XYZ SWITCHBOX
(RS-232 Serial)

Designed for CRT terminals,
LQ printers and CPU ports

Measuring only 7" x 10" x 3", the XYZ SWITCHBOX permits manual switching of a common port to any of 3 distribution ports. This is accomplished by 4 internally mounted DIP switches. Each port can be separately configured for normal or null-modem use and can enable, disable or jumper lines 4, 5, 6, 8 and 20. This versatile switching capability permits rapid configuration for CRT terminals, LQ printers and CPU ports. A CPU port may select any of 3 different printers or terminals. Likewise, 3 different CPU ports may select one printer or terminal. No batteries, external power or wiring required.

Part No. 232SB (Standard Model) **ONLY \$185.00**
Part No. 232SB-A (Model with LED) **\$229.00**

SYZYGY™ # 49
P.O. Box 4036 • 256 W. San Bernardino Rd., Covina, CA 91723
(213) 332-3320

printing density and vertical printing density.

Program Comments

The program is essentially equations (4) and (8). The rest of the program is the necessary supporting cast. Only those portions of the program that require an explanation are discussed here.

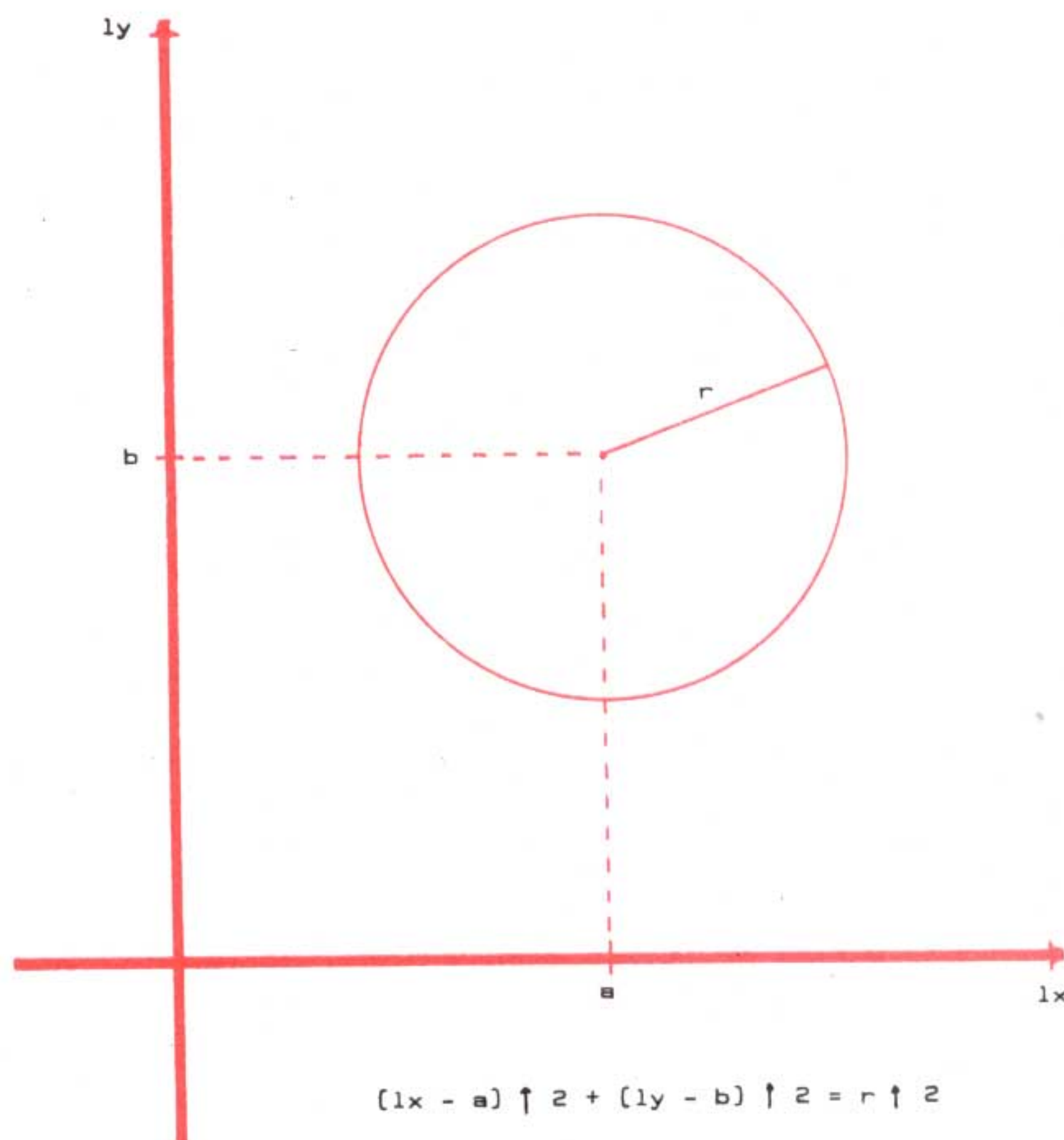
Line Specs— Each of the lines to be used as a pie segment is described by its slope, and therefore by its angle. For the screen, this is determined in lines 720 to 820, and in lines 2150 to 2250 for the printer. The variable used for the angle of line I is AN(I).

Circle Loop— The loop for drawing a circle consists of lines 840 to 1100 (video), and lines 1340 to 1620 (printer).

Hidden Lines— Controls have been built in so that only the portion of the figure that falls within the limits of the computing medium is drawn. If a user is careless enough, no pie chart will appear. These controls may be observed in the transfers to the NEXT Y command in line 1100 (screen) and line 1620 (printer).

Figure 1

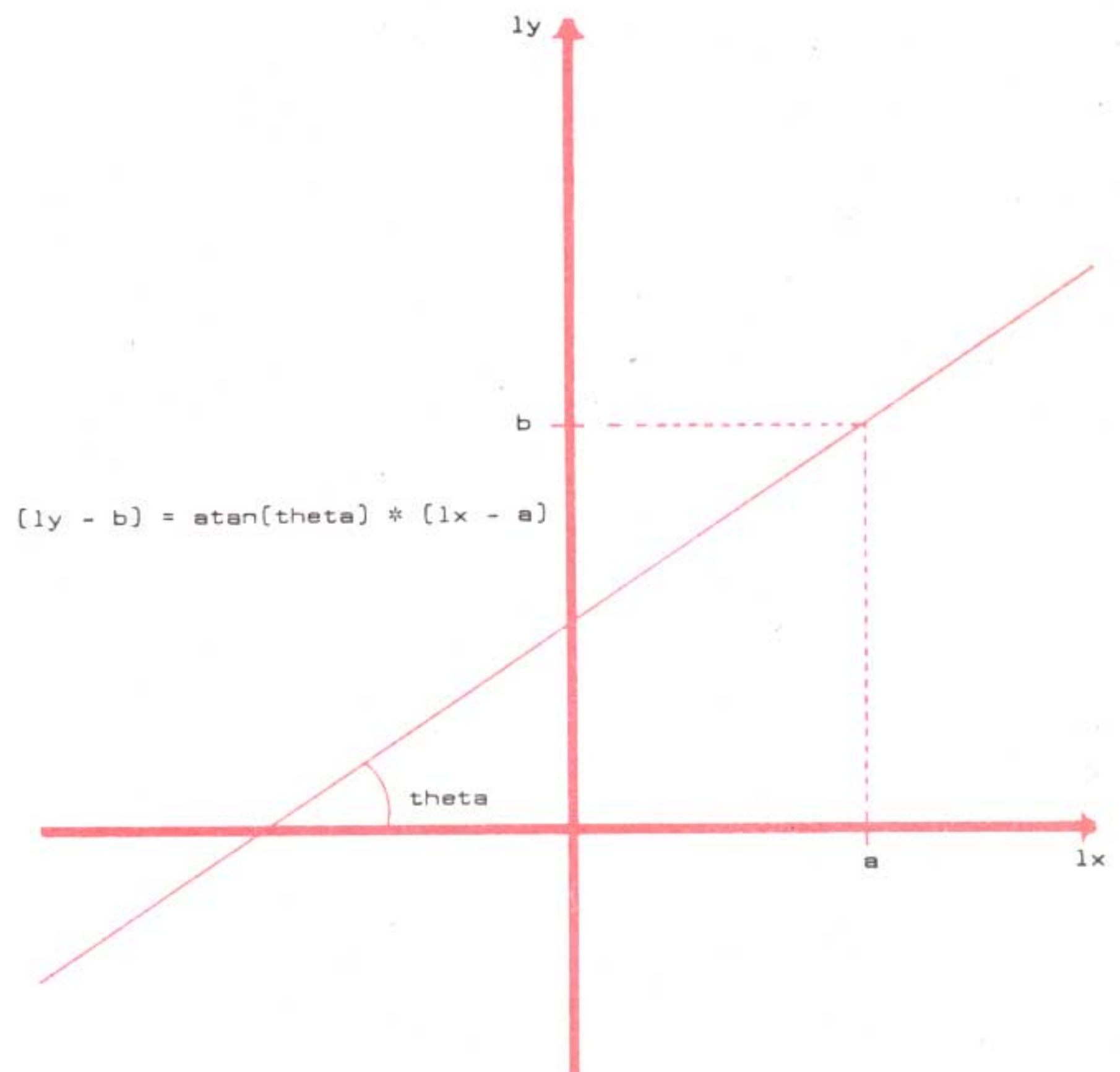
Equation and graphic representation of a circle.



Formulas— The formula for the circle (4) is on lines 1400 and 1410 for the printer. The formula for the line appears on line 1520. For the screen, the formulas are a bit different. The one for the circle is on lines 890 and 900, and for the line on lines 1010 and 1060.

Straight Lines— The loop to draw the points on lines that fall within the circle and on the horizontal slice is between lines 930 and 1080 (screen) and between 1430 and 1590 (printer). Vertical lines are treated as special cases.

Figure 2
Equation and graphic representation
of a straight line.



Boundaries of Straight Lines— To draw only a piece of the line, the left and right halves of the circle are treated separately and it is determined whether the point falls within the boundary (center vertical line and circle periphery). In the program, this vertical line is

NEW for the Color Computer TRS-80 'COCOCASSETTE' SUBSCRIPTION SOFTWARE

* TRS-80 IS A TRADEMARK OF TANDY COMPANY



ENJOY A MONTHLY COLLECTION OF 8-10 PROGRAMS!

Including games, education, home finance and more; on cassette for as low as \$5.00 a month! Add some action and imagination to your Color Computer. ... Best of all, we do the work!

PRICES

1 YR (12 ISSUES) . . .	\$55.00
6 MO (6 ISSUES) . . .	\$30.00
SINGLE COPIES . . .	\$ 6.00

—MICHIGAN RESIDENTS ADD 4% TO ORDER
—OVERSEAS ADD \$10.00 TO SUBSCRIPTION AND \$1.00 TO SINGLE COPIES

616 396-7577



PROGRAMS ARE FOR
EXTENDED BASIC
MODEL ONLY. ISSUES
ARE SENT FIRST CLASS.

SUBSCRIPTION SOFTWARE



50

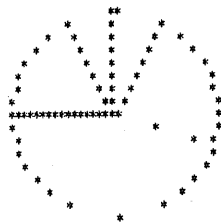
SEND CHECK OR MONEY ORDER TO:



T & D SOFTWARE P.O. BOX 256-C • HOLLAND, MICH 49423

Figure 3
Sample printer output of the program.

Test for Hardcopy Output of a Pie Chart Grade Distribution on Test Number 3



Segment numbering: starting from 12 noon, clockwise

(1) Proportion of A's	8.00 %
(2) Proportion of B's	22.00 %
(3) Proportion of C's	45.00 %
(4) Proportion of D's	17.00 %
(5) Proportion of F's	8.00 %

determined by A% (screen) and A (printer). These decisions are made in lines 990 to 1020 and 1040 to 1070 (screen), and 1500 to 1530 and 1550 to 1580 (printer).

Zero— The twelve noon radial line is the arbitrary zero, or starting point, to draw the rest of the radial lines. Each point on this line is drawn in lines 1090 (screen) and 1580 (printer).

This program solves the problems associated with

distortion of graphics in a media where horizontal and vertical scales are different, and vary from run to run. These problems are classic with the printer—horizontal and vertical printing densities may be set to different values in each run.

Program Listing for Pie Charts

```

100 ' MACHINE DEPENDENT FEATURES
110 '
120 'This program was developed to run
on a Model III TRS-80
130 'operating under TRSDOS 1.2, and us
ing an Okidata
140 'Microline 80 printer for the hardc
opy output. The use of
150 'Disk BASIC implies only one set of
changes for non disk
160 'BASIC: the use of the MID$ functio
n on the left hand side
170 'of the equal sign. This is easily
resolved for these
180 'systems by making the following ch
anges:
190 '
200 ' Change statements of the form
210 '
220 ' MID$(W$,M,N)=U$
230 '
240 ' to the form
250 '
260 ' W$=LEFT$(W$,M-1)+U$+RIG
HT$(W$,LEN(W$)-M+N+1)
270 '
280 'The statements that are specific t
o the printer are the
290 'LPRINT statements that output cont
rol characters. To make
300 'the necessary changes just change
the statements
310 '
320 'Horizontal density:
330 ' LPRINT CHR$(30) : 10
char/in
340 ' LPRINT CHR$(31) : 5
char/in
350 ' LPRINT CHR$(29) : 16.5
char/in
360 'and vertical density:
370 ' LPRINT CHR$(27);CHR$(54
): 6 lines/in
380 ' LPRINT CHR$(27);CHR$(56
): 8 lines/in
390 '
400 'to the corresponding statements fo
r a particular printer.

```



Announcing the
**TWENTY-FIRST
CENTURY CLUB**

1607 N. Cochran

P.O. Box 2046 Hutchinson, Ks. 67501-0396
316-663-1047

- * Of interest to all TRS-80 computer owners.
- * Benefit from club volume purchasing. Savings up to 50% of retail on popular products.
- * Objective, unbiased, tough reviews of hardware, software, systems, supplies, Critical analysis of what products can and cannot do.
- * Newsletters with stories, industry news. Practical uses for business, personal, professional, hobby and entertainment.
- * Programming, support for compilers, Basic, etc. Beginners and advanced.
- * Comparison of product groups by cost, capabilities, etc.
- * A source for selling your own programs and inventions.
- * **MEMBERSHIP \$25.00 PER YEAR**

Master Card and Visa accepted

51


```

410 '
420 DEFINT I-N, X, Y
430 DIM AN(20), PR(20), DES(21)
440 CLEAR 2000
450 PI=3.1415926
460 CLS: PRINT TAB(23) "Pie chart graphs"
470 GOSUB 2330 'Get descriptions
480 CLS
490 PRINT "Output to the (1)screen, (2)
printer. (3)Finish."
500 K$=INKEY$: IF K$="" THEN 500 ELSE
K=VAL(K$)
510 IF K<1 OR K>3 THEN 500
520 IF K=2 THEN 1260
530 IF K=3 THEN CLS: END
540 '
550 ' ***** Output to the video *****
560 '
570 CLS
580 PRINT "Measurements will be in pixels
1 units: The screen measures"
590 PRINT "48 units vertically (Y units
) and 128 units horizontally"

```

```

600 PRINT "(X units). If the specified
units are too large, only the"
610 PRINT "piece of the pie that passes
over the screen will be visible."
620 C0=2.1
630 PRINT
640 INPUT "Pie radius in Y units: "; R%
650 PRINT
660 INPUT "X units from left margin to
pie center: "; A%
690 PRINT
700 INPUT "Y units from top margin to p
ie center: "; B%
710 AP=0
720 FOR I=1 TO NP
730 PRINT: PRINT "Fraction of piece"; I
;: INPUT " of pie: "; PR(I)
740 IF PR(I)>=1 OR PR(I)<=0 THEN GOTO 7
30
750 AP=AP+PR(I)
760 IF AP>1 THEN AP=AP-PR(I): PRINT "Su
m of fractions greater than 1": GOTO 73
0
770 PR(I)=AP

```

BOOK/DISK COMBINATIONS

BECAUSE YOU DIDN'T BUY A COMPUTER TO PRACTICE YOUR TYPING

• Practical manuals that show you how to program your TRS-80™ for business, learning, and pleasure • Convenience disks that contain all the programs and subroutines in the books they accompany—error free and ready to run
PLUS the Wiley expertise that has helped more than a million people learn how to program, use, and enjoy microcomputers.
Look for them at your favorite bookshop or computer store. Or, check the sets that interest you, fill in the ordering information, and mail us this ad.

JOHN WILEY & SONS, Inc.
605 Third Avenue, New York, N.Y. 10158
In Canada: 22 Worcester Road, Rexdale, Ontario M9W 1L1

For faster service call toll free: 800-526-5368.
In New Jersey, call collect (201) 797-7809.
Order Code # 3-6771: VISA, MasterCard,
American Express accepted on phone orders.

☐ THE TRS-80™ MEANS BUSINESS SET

Ted G. Lewis

Covers file merging, data base, word processing, payroll, financial analysis, and scores of other business applications. Includes one 8" disk for TRS-80™ Model II. (Requires two disk drives, 64K of memory.) 1-87565-1 \$32.90

FAST BASIC: BEYOND TRS-80™ BASIC SETS

George A. Gratzer with Thomas G. Gratzer

Learn a streamlined form of BASIC that accelerates computations by 3 or 4 times... and some functions by a factor of 1,000. Available in disk or cassette for TRS-80™ Model I and Model III. (Requires 32K of memory.)

- ☐ Model I Disk Set: (one 5¼" disk) 1-89844-9 \$34.90
- ☐ Model III Disk Set: (one 5¼" disk) 1-89845-7 \$34.90
- ☐ Cassette Set (for Model I or Model III): 1-89846-5 \$34.90

Please send the sets indicated for 15-DAY FREE EXAMINATION. (Restricted to the continental U.S. and Canada.)

MAIL TO: JOHN WILEY & SONS, Inc., P.O. Box 092, Somerset, N.J. 08873.

- ☐ Payment enclosed, plus sales tax. Wiley pays postage/handling. We normally ship within 10 days. If shipment cannot be made within 90 days, payment will be refunded.
- ☐ Bill me. ☐ Bill firm or institution

NAME

AFFILIATION

ADDRESS

CITY/STATE/ZIP

SIGN HERE

Prices subject to change without notice.

3-6771

TRS-80 is a trademark of Tandy Corp. # 52


```

780 IF PR(I)=.5 THEN AN(I)=-PI/2: GOTO
820
790 IF PR(I)=.75 THEN AN(I)=PI: GOTO 82
0
800 AN(I)=ATN(TAN(PR(I)*2*PI-PI/2))
810 IF PR(I)>.5 AND PR(I)<1 THEN AN(I)=
-AN(I)
820 NEXT I
830 CLS
840 FOR Y=FIX(B%-R%+.5) TO FIX(B%+R%+.5
)
850 IF Y<0 OR Y>47 THEN GOTO 1100
860 SQ=R%*R%-(Y-B%)[2
870 IF SQ<-.1 THEN GOTO 1100
880 SQ=SQR(ABS(SQ))
890 XL=FIX(A%-C0*SQ+.5)
900 XR=FIX(A%+C0*SQ+.5)
910 IF XL >=0 AND XL<128 THEN SET(XL,Y)
920 IF XR >=0 AND XR<128 THEN SET(XR,Y)
930 FOR I=1 TO NP
940 IF ABS(AN(I))<>PI/2 THEN GOTO 980
950 IF SGN(AN(I))>0 THEN GOTO 1080
960 IF Y>B% AND A%>=0 AND A%<128 THEN S
ET(A%,Y): GOTO 1080
970 GOTO 1080

```

```

980 IF PR(I)<.5 THEN GOTO 1040
990 IF ABS(TAN(AN(I)))<=.001 AND Y=FIX(
B%+.5) THEN FOR X=A% TO XL STEP -1: IF
X<0 OR X>127 THEN NEXT X: GOTO 1100 ELS
E SET(X,Y): NEXT X: GOTO 1080
1000 IF ABS(TAN(AN(I)))<=.001 THEN GOTO
1080
1010 X=FIX(A%+C0*(Y-B%)/TAN(-AN(I))+.5)
1020 IF X>XL AND X<A% AND X>=0 AND X<12
8 THEN SET(X,Y)
1030 GOTO 1080
1040 IF ABS(TAN(AN(I)))<=.001 AND Y=FIX
(B%+.5) THEN FOR X=A% TO XR: IF X<0 OR
X>127 THEN NEXT X: GOTO 1080 ELSE SET(X
,Y): NEXT X: GOTO 1080
1050 IF ABS(TAN(AN(I)))<=.001 THEN 1080
1060 X=FIX(A%+C0*(Y-B%)/TAN(AN(I))+.5)
1070 IF X<XR AND X>A% AND X>=0 AND X<12
8 THEN SET(X,Y)
1080 NEXT I
1090 IF Y<=B% AND A%>=0 AND A%<128 THEN
SET(A%,Y)
1100 NEXT Y
1110 K$=INKEY$: IF K$="" THEN 1110
1112 '
1113 ' ***** Output labels to the scree
n *****
1114 '
1120 CLS: I1=1
1130 FO$="!### %

```

First came MICROPROOF™:

"There is simply no finer program available..."
(Creative Computing, March 1982)

Now:

**Electric
Webster**
SPELLING CHECKER

The Ultimate:

FAST—Can proof ten pages in a minute
EASY—Operates at the stroke of a key
COMPLETE—50,000 word literal dictionary
COMPACT—Fits on 5¼" double density disk
VERSATILE—Use with all W P programs
CORRECTS—(Optional, add \$60.00)
AFFORDABLE—\$89.50 (TRS-80®),
\$149.50 (CP M®)

**CORNUCOPIA
SOFTWARE, INC.**

1625 Beverly Place
Berkeley, CA 94707

53

Contact your local dealer, or order direct — (415) 524-8098

```

% ###.## !"
1140 PRINT T1$: PRINT T2$: PRINT
1150 IF NP+1<=12 THEN I2=NP+1
1160 FOR I=I1 TO I2
1170 IF I=1 THEN PC=PR(1)
1180 IF I=NP+1 THEN PC=1-PR(NP)
1190 IF I>1 AND I<=NP THEN PC=PR(I)-PR(
I-1)
1200 PRINT USING FO$; "(";I;")";DE$(I);
PC*100;"%"
1210 NEXT I
1220 K$=INKEY$: IF K$="" THEN 1220
1230 IF I2<>NP+1 THEN I1=I2+1: I2=NP+1:
GOTO 1160
1240 GOTO 480
1250 REM
1260 REM ***** Output to printer *****
1270 REM
1280 PRINT: LINE INPUT "Character to dr
aw pie with: "; C$
1290 C$=LEFT$(C$,1)
1300 GOSUB 1750 'Printer alignment
1310 LPRINT T1$: LPRINT T2$: LPRINT: LP
RINT
1320 GOSUB 1880 'Get printer parameters
1330 KB=FIX(XF*A+.5)

```



```

1340 FOR Y=FIX(YF*(B-R)+.5) TO FIX(YF*(
B+R)+.5)
1350 IF NM>FIX(1+XF*(A+R)+.5) THEN NM=F
IX(1+XF*(A+R)+.5)
1360 PL$=STRING$(NM,32)
1370 SQ=R*R-(Y/YF-B) [2
1380 IF SQ<-.1 THEN GOTO 1620
1390 SQ=SQR(ABS(SQ))
1400 XL=FIX(1+XF*(A-SQ)+.5)
1410 XR=FIX(1+XF*(A+SQ)+.5)
1420 IF XL>=1 AND XL<NM+1 THEN MID$(PL$
,XL,1)=C$
1430 FOR I=1 TO NP
1440 IF Y<=YF*B THEN MID$(PL$,KB,1)=C$
1450 IF ABS(AN(I))<>PI/2 THEN GOTO 1490

1460 IF SGN(AN(I))>0 THEN GOTO 1590
1470 IF Y>YF*B THEN MID$(PL$,KB,1)=C$:
GOTO 1590
1480 GOTO 1590
1490 IF PR(I)<.5 THEN GOTO 1550
1500 IF ABS(TAN(AN(I)))<=.001 AND Y=FIX
(YF*B+.5) THEN FOR X=XL TO KB: IF X<1 O
R X>NM THEN NEXT X: GOTO 1590 ELSE MID$
(PL$,X,1)=C$: NEXT X: GOTO 1590

```

```

1510 IF ABS(TAN(AN(I)))<=.001 THEN GOTO
1590
1520 X=FIX(1+XF*(A+(Y/YF-B)/TAN(-AN(I))
)+.5)
1530 IF X>XL AND X<KB AND X>=1 AND X<NM
+1 THEN MID$(PL$,X,1)=C$
1540 GOTO 1590
1550 IF ABS(TAN(AN(I)))<=.001 AND Y=FIX
(YF*B+.5) THEN FOR X=KB TO XR: IF X<1 O
R X>NM THEN NEXT X: GOTO 1590 ELSE MID$
(PL$,X,1)=C$: NEXT X: GOTO 1590

1560 IF ABS(TAN(AN(I)))<=.001 THEN 1590

1570 X=FIX(1+XF*(A+(Y/YF-B)/TAN(AN(I))
+.5)
1580 IF X<XR AND X>KB AND X>=1 AND X<NM
+1 THEN MID$(PL$,X,1)=C$
1590 NEXT I
1600 IF XR>=1 AND XR<NM+1 THEN MID$(PL$
,XR,1)=C$
1610 LPRINT PL$
1620 NEXT Y
1630 LPRINT CHR$(30): LPRINT CHR$(27);C
HR$(54)

```

Subscribe
to CCN

Color Computer
News



Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding on ad for a Color Computer program

did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

But take heart there is a cure! It's COLOR COMPUTER NEWS.

The monthly magazine for Color Computer owners and only Color Computer owners. CCN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.

The price for 12 monthly treatments is only \$21.00 and is available from:



Mail
Today!

54

REMarkable Software

P.O. Box 1192
Muskegon, MI 49443

NAME _____
ADDRESS _____
CITY _____ State _____ Zip _____

Allow 8-10 weeks for 1st issue.

80 US


```

1631 '
1632 ' ***** Output of labels to the pr
inter *****
1633 '
1640 FO$="!### %
          % ###.## !"
1650 LPRINT: LPRINT
1660 LPRINT "Segment numbering: startin
g from 12 noon, clockwise": LPRINT
1670 FOR I=1 TO NP+1
1680 IF I=1 THEN PC=PR(1)
1690 IF I=NP+1 THEN PC=1-PR(NP)
1700 IF I>1 AND I<=NP THEN PC=PR(I)-PR(
I-1)
1710 LPRINT USING FO$; "(";I;")";DE$(I)
;PC*100;"%"
1720 NEXT I
1730 GOSUB 1750 : GOTO 480
1740 REM
1750 REM ***** Printer alignment *****
1760 REM
1770 PRINT
1780 PRINT "Want to align printer (Y/N)
:";
1790 K$=INKEY$: IF K$="" THEN 1790
1800 IF K$="N" THEN RETURN
1810 IF K$<>"Y" THEN 1790
1820 PRINT

```

```

1830 PRINT: PRINT "Make sure the printe
r is turned on, then hit <ENTER>"
1840 K$=INKEY$: IF K$="" THEN 1840
1850 PRINT: PRINT "To stop paper moveme
nt, hit any key."
1860 K$=INKEY$: IF K$<>" " THEN RETURN E
LSE LPRINT: GOTO 1860
1870 REM
1880 REM ***** Get printer parameters *
****
1890 REM
1900 CLS
1910 PRINT "Horizontal linear density -
in characers per inch"
1920 PRINT "      (1) 10 Characters/inch
- normal"
1930 PRINT "      (2) 5 Characters/inch
- big"
1940 PRINT "      (3) 16.5 Characters/in
ch - tiny"
1950 K$=INKEY$: IF K$="" THEN 1950
1960 K=VAL(K$)
1970 IF K<1 OR K>3 THEN 1950
1980 IF K=1 THEN XF=10 ELSE IF K=2 THEN
XF=5 ELSE XF=16.5
1990 IF K=1 THEN LPRINT CHR$(30): NM=71
2000 IF K=2 THEN LPRINT CHR$(31): NM=36
2010 IF K=3 THEN LPRINT CHR$(29): NM=13
2: GOSUB 2270

```

```

2020 PRINT
2030 PRINT "Vertical linear density - i
n characters per inch"
2040 PRINT "      (1) 6 Lines/inch - nor
mal"
2050 PRINT "      (2) 8 Lines/inch - com
pact"
2060 K$=INKEY$: IF K$="" THEN 2060 ELSE
K=VAL(K$)
2070 IF K<1 OR K>2 THEN 2060
2080 IF K=1 THEN YF=6 ELSE YF=8
2090 IF K=1 THEN LPRINT CHR$(27);CHR$(5
4)
2100 IF K=2 THEN LPRINT CHR$(27);CHR$(5
6)
2110 PRINT: INPUT "Circle radius, in in
ches: "; R
2120 PRINT: INPUT "Inches from the left
margin to the pie center: "; A
2130 PRINT: INPUT "Inches from the top
margin to the pie center: "; B
2140 AP=0
2150 FOR I=1 TO NP
2160 PRINT: PRINT "Fraction of piece";
I;: INPUT "of pie: "; PR(I)
2170 IF PR(I)>=1 OR PR(I)<=0 THEN GOTO
2160

```

FREE business software directory

- Radio Shack's Model I, II, III.
- Heath's MBASIC and HDOS
- CPM: Xerox, Alto...
- IBM Personal Computer

"IDM2 is GREAT !" - publisher of 80-US

"(GL) superior to either the Osborne (SBSG & Taranto) or Radio Shack... MAIL-X has a greater capacity... more flexible than (R.S.)" - columnist of 80-microcomputing

"imperceptively fast...(DBMS) is a good and reliable workhorse" - publisher of Interface Age

Data base manager, integrated accounting package (AR, AP, GL & Payroll), inventory, word processing, and mailing list. Compare and be selective !

55



Micro Architect, Inc.
96 Dothan St., Arlington, MA 02174


```

2180 AP=AP+PR(I)
2190 IF AP>1 THEN AP=AP-PR(I): PRINT "S
um of fractions is greater than 1.": GO
TO 2160
2200 PR(I)=AP
2210 IF PR(I)=.5 THEN AN(I)=-PI/2: GOTO
2250
2220 IF PR(I)=.75 THEN AN(I)=PI: GOTO 2
250
2230 AN(I)=PR(I)*2*PI-PI/2
2240 IF PR(I)>.5 AND PR(I)<1 THEN AN(I)
=-AN(I)
2250 NEXT I
2260 RETURN
2270 REM ***** Warning for use of tiny
characters *****
2280 PRINT
2290 PRINT "You should have executed 'F
ORMS (WIDTH=132)' while under"
2300 PRINT "TRSDOS if a large circle wi
th tiny characters is needed."
2310 PRINT: PRINT "Hit any key to conti
nue, or hit <BREAK>."
2320 K$=INKEY$: IF K$="" THEN 2320 ELSE
RETURN

```

```

2330 REM
2340 REM *** Titles and segment descrip
tions ***
2350 REM
2360 PRINT: LINE INPUT "Line 1 of title
: "; T1$
2370 T1$=LEFT$(T1$,63)
2380 PRINT: LINE INPUT "Line 2 of title
: "; T2$
2390 T2$=LEFT$(T2$,63)
2400 PRINT: INPUT "Number of segments i
n pie (>1): "; NP
2410 IF NP<=1 THEN PRINT "Number must b
e greater than one": GOTO 2400
2420 NP=NP-1
2430 PRINT: PRINT "For each of the"; NP
+1; "segments of the pie enter a"
2440 PRINT "description or label (<48 c
haracters)": PRINT
2450 FOR I=1 TO NP+1
2460 PRINT "Segment"; I;: LINE INPUT DE
$(I)
2470 DE$(I)=LEFT$(DE$(I),47)
2480 NEXT I
2490 RETURN

```

CompuKids

magazine & club

Help your child discover the world of
Microcomputing.

Club includes: • One Year Magazine Subscription

- Program Exchange • Free Computer Advice
- Educational Programs • Exciting Contests
- and more

Membership

\$24.00

Subscription Only

\$16.00

— WANTED —

Articles, Stories, Cartoons,
and Programs of interest to
the young people.

56

MAIL YOUR CHECK TODAY TO COMPUKIDS

P.O.B. 874 SEDALIA, MISSOURI 65301 PHONE 816/826-0689

Captain 80

The adventures of a software secret agent

© 1982, Bob Liddil

This is the city. Peterborough, New Hampshire. There are three thousand occupants of this quaint little New England hamlet. Each one has a story. I live here, too. I'm a software reviewer.

It was Friday the seventh. I was working the day shift out of Arcade Division when a late breaking game came in. My assignment... review it. The boss is Mike Schmidt, my partner is a sentient expansion interface resident named Max. My name's Eighty.

By now we all know the success story behind Big Five Software. The boys who yanked this fine little company up by its bootstraps have been extolled in legend and on Good Morning America. Their rags-to-riches story is most inspiring for all the toilers in the vineyards of computerdom. But did they *earn* all this attention? You bet they did.

Each of the arcade games released under the Big Five label has unique entertainment qualities that offset any flaws, major or minor, that a critic might find. Even Robot Attack which I panned in a recent column has highly polished graphics and very passable sound.

This new Defense Command, (as seen on TV's Good Morning America), is *superb*! It combines several proven elements of arcadia into a super hybrid of laudable quality.

Picture this if you will. Momma Ship slides out onto the screen and disgorges assorted playing pieces, including you, the canisters you are protecting and some of the many creepy, floaty thingies that are your enemies. Shooting Momma Ship produces an unusual video tantrum. One usually does that once only.

Now that the playing field is arranged we have invaders, things floating down from the sky while you, brave defender, blast them into atoms. If the aggressors get past you they steal the little canisters. You can still shoot the invaders as they abscond with the goodies, but then you have to catch them as they fall, (for extra points, natch).

You have smart bombs. But there are pregnant aliens ala the Merv bombs in Missile command. Hit one of those and you'll *need* a smart bomb... or two... or three.

There are other surprises in Defense Command. But something that comes as no surprise is the utter excellence of the game. As an entertainer, as an arcade, as an outlet for hand-eye coordinationists, and as a dollar value Defense Command succeeds. In short, my money was well spent and I had a good time with the game. Big Five... keep up the good work.

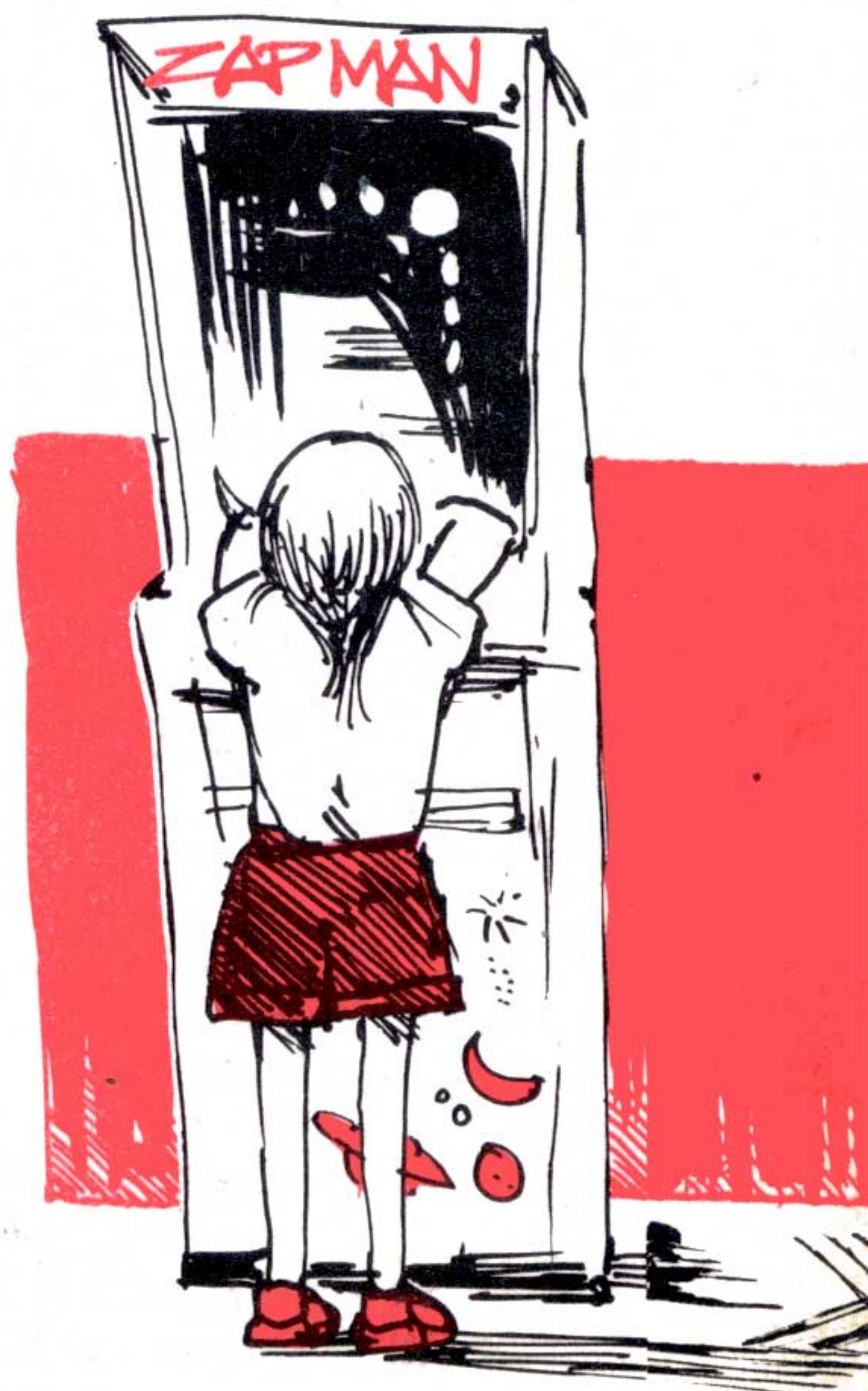
As I stare out the window at Mt. Monadnock, which overlooks the house I live in, I am reminded of other success stories in this fledgling industry. It is possible to make it selling computer software but not as easy for beginners as it was.

Acorn, for example, which has many fine titles, and one of the best reputations in the industry, customer wise, started in the coal cellar of a Washington, D.C. townhouse. Its first program was an inauspicious little number called Ting Tong, which mimicked the earliest of classic video games.

Acorn has had many hits since Ting Tong. Its first version of Pinball was an exciting graphic exercise, and who can forget Duel-N-

Droids, a Christopherson classic which paved the way for the new graphics era.

Even Instant Software, which constantly suffers from the Wayne Green shoot-in-foot syndrome, had humble beginnings. Long before the purchase of the huge motel they occupy, they were just a hole-in-the-wall, one of the many Wayne Green experiments that have gone up the flagpole over the years. Many top flight authors. Sparky Sarks,



(Starfighter from Adventure International) introduced the Solar Galactic Authority Navy in a still marketed program called Ball Turret Gunner. Jake Commander who wrote Macro-Mon, (The Shadow, from AOS) rated one of the top utility tools in 80 microdom, began with Instant Software as a submitee, with simple renumber and patch programs. Jake is now technical editor at *80 Microcomputing Magazine* and a respected authority on TRS-80 products and procedures.

Robert Krotts, of Dayton, Ohio, whose tounge-in-cheek Softcore Software Company pokes fun at the seriousness with which Adventure publishers market their work, has experienced modest success with Wet Tee-Shirt Contest and Madame Rosa's Massage Parlor, both of which aren't suitable for your 10 through 12-year-old. He'll never get rich, but then, he's not really trying to.

Al Loose, of Las Vegas, Nevada, producer of Forbidden Planet and Forbidden City, which are popular talking Adventures, is another new face experiencing success. His programs are worth their price and the public knows it.

But for every success story there are shattered dreams. Mad Hatter Software died early on, taking Greg Hassett with them. Only Fasteroids, renamed Planetoids for Adventure International, survived. Adventure World, Greg's own attempt at marketing, failed. Computer Light and Sound, a southern California company which had two really top notch arcade games, never made it to the national marketplace. Even Programma International, which had everything you could ask for, marketing wise, bit the dust in a flurry of bankruptcy and broken promises.

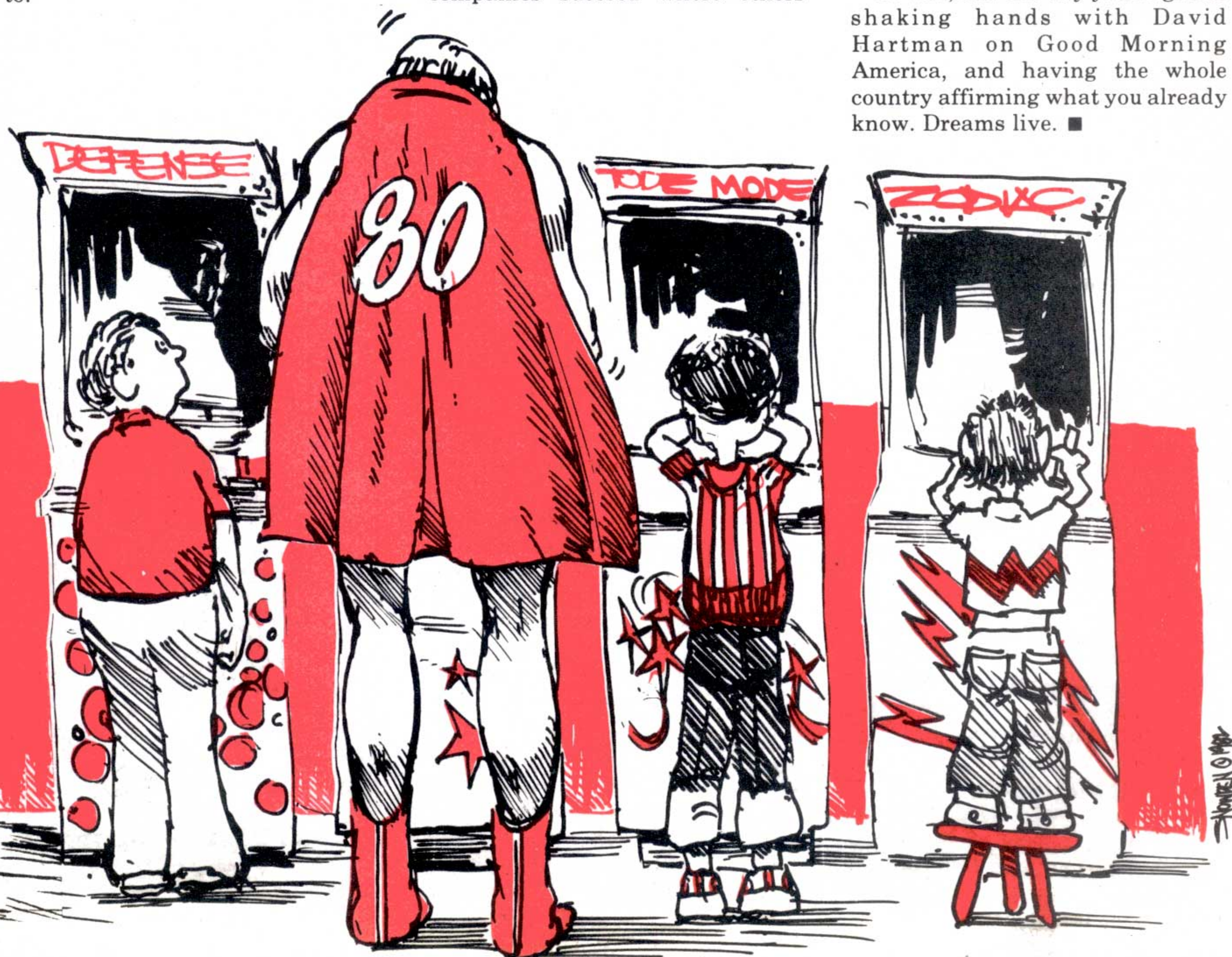
What's the handle for that trip to the stars, then? How do some companies succeed where others

fail? Advertising is one. Without national advertising over a period of months, a new company cannot hope to survive. And it is not direct sales response that floats the new company, it is dealer sales. The advertisements must be backed up by widespread distribution or the consumer will not buy.

You, the very reader who holds this issue of *80-U.S.* in his hands, may be the next dreamer whose hopes are dashed to bits, or the next fresh entrepreneur who feeds the burning consumer flame in its quest for new programs.

So it is with the voice of experience that I beseech you, *be careful* if you plan to market your program. *Know your publisher*, if he is your marketer, or, if you are doing it yourself, *don't give credit* in any amount you can't afford to shrug away. Put your end user before yourself and give him more than what he pays for.

Do this, and one day you might be shaking hands with David Hartman on Good Morning America, and having the whole country affirming what you already know. Dreams live. ■



@ News

Spencer Hall, Associate editor

Hands Across the Sea

Answers to two letters from Europe will be of general interest to all persons overseas who are interested in the ESF. First to Bernhard von Tauchnitz of Berlin, Germany, let me apologize for what seems to have been an oversight at Exatron. Your letter dated last November, was in the collection I received from Jim Perry. There was a large green question mark on it. Exatron has an overseas software catalog. You should write to them direct at 181 Commercial Street, Sunnyvale, CA 94086. Also, you say there are errors in the German translation of the Operator's Manual. Because you have waited so long, I am personally sending you a copy of @LOAD Volume 0, Number 1, and my spare copy of the manual. I hope the bits don't get knocked off the wafer by stray radiation during the long journey.

A more recent letter to me, care of 80-U.S., comes from Derek Trayler in Hornchurch, Essex, England. They tell me at Exatron that they are not actively promoting the establishment of ESFOA chapters in foreign countries. Primarily because the discount on Exatron products which these groups receive cannot be offered to them. It appears that this would violate agreements with foreign distributors of Exatron products. Your question about the Video Genie will interest many, I'm sure. Can the ESF be used with it? The answer is yes and possibly no. Video Genie is a product of EACA International, Limited, of Hong Kong. It is distributed in the U.S. as the PMC . . . of which there are several models. Those models which contain a built-in cassette deck are virtual clones of the TRS-80 Model I. The ESF can be used with it if you can obtain the bus conversion accessory which converts the fifty-lead cable to the standard Model I

90 80-U.S. Journal



forty-lead cable. PMC sells this in the U.S. Whether it is obtainable in England or not, I don't know.

Lore of the ESF

FMS (File Management System) has been Exatron's all time best selling program . . . and for good reason. Version 2 makes a good thing substantially better.

FMS is a Database Manager. It produces a user defined file of records which contain named fields, such as author, title, last name, first name, street address . . . anything the user designates, up to fourteen-string, integer or single-precision fields. These records can be sorted on any field, selected to include specified elements only, formatted in tabulations or as labels with confidential data not printed, etc., etc.

Unfortunately, for many of us, the complete set of programs will cost \$80.00 versus a mere \$19.95 for the old FMS. If you want this power, though, it's still a bargain compared to the equivalent software available on disk. At this writing, deliberations are underway concerning whether to sell some of

the important modules separately for a fraction of the total cost.

The documentation of all six programs in the system is consistently excellent. Two of these programs are new ESF I/O routines, versions 4.1B and 4.1C, written especially for this package. These almost certainly will be available separately. They are, to say the least, remarkable. Features common to both are as follows. Recorded before the main FMS on your wafer, they end their load by starting LOAD of the next file. As shipped, the main FMS is recorded in AUTORUN mode which means that it runs as soon as it loads. Thus you @LOAD1 only. The I/O message appears, FMS loads automatically and starts. There's never a chance to forget the I/O routine! That's only the beginning.

With I/O 4.1B and 4.1C in place you can TAB all the way to 132 without any funny business to get past 64.

These routines also add two powerful words to BASIC. The @LINE command beats INPUT and many of the INKEY\$ routines we have all written (80-U.S. has a

file full of manuscripts containing such input routines). It does what **LINE INPUT** in Level III and disk **BASIC** does, namely, accepts all punctuation including the delimiters (quote, semi-colon, comma). It is lightning fast and doesn't gobble string space like an **INKEY\$** routine. Many programs, including **FMS**, accept all input as strings, converting numerics via a **VAL** statement. With **@LINE** you can make this conversion before any string space is used! This avoids visits from the "garbage collector" to remove unneeded strings . . . which can cause horrendous slowdowns if a program uses large amounts of string space.

More spectacular is the **@S** command. When used with the proper array designators as operands, this calls an incredibly fast machine language routine to sort the array on the field designated. For me it sorted an eight-record file within a small fraction of a second. I was back in the menu so fast I thought the program contained a bug! Throw away your big treatises on the many kinds of **BASIC** sorts. Just use **@S** in your programs. Users will be glad to know that **@PRINT** does not leave 256-byte gaps on the wafer, and hence, makes much more efficient use of wafer capacity. Last, but by no means least, they verify the file and warn you if it was not successfully recorded.

Buy **FMS 2** and you get super-power to use in your own programs. Don't, however, plan to market your own software using them. The author has not, in this release, placed his powerful code in the public domain.

Another reason for the hefty price tag is that the author has put remark statements in the **BASIC** code of the main program so that you can now see where each command is executed. This has two advantages. First, **FMS 2** is much easier to customize, which is customary in all big ticket applications programs. Second, you can increase your programming skills by studying the many elegant touches with which **FMS** abounds.

Reason for two I/O routines is

that there are two **FMS** programs. The "regular" one takes strings and numeric fields. The other takes only strings, holding more in the same memory size than the first and processing them even more efficiently.

The power of **FMS 2** becomes apparent when you decide what you want to do. As just one example, a file by name and address could contain birthdates, phone numbers and possibly some confidential information such as credit rating, ages of family members, etc. You can make mailing labels from this file by suppressing, or **HIDE**ing what you don't want to appear and then formatting the output as a mailing label complete with the necessary spaces between records to fit the size of your continuous feed labels. You could code a music cassette library with just one alpha character to represent the quality of each recording and then select just those with an **E** for excellent (or **P** for poor) and make a special listing of these. Your file of colored slide descriptions could be similarly coded to indicate **S** (snow scenes), **F** (family pictures) or whatever. Now you can easily **SELECT** the slide numbers to pull actual slides from the file box which fall in the desired category. Get the point?

In addition to the two I/O routines and the two versions of **FMS 2**, there are two more programs. One is a **BASIC** routine which will convert an all-string file written with either the old or the new version of **FMS** in the string-and-numeric pattern for use in the string-only mode. Yes, you heard right. **FMS 2** will read files written by the original **FMS**. You don't have to reenter them to get the increased power and capacity. The last program will analyze the format of an **FMS** file in terms of the **FMS** format scheme. With this information, you can then write your own applications programs which access and process **FMS** data files.

The bottom line is simply that **FMS 2** is a total system and not a toy. The author worked until recently as a programmer for a blue chip mainframe corporation — and it shows in **FMS 2**. ■

FOR TRS-80 MODEL I OR II IBM PERSONAL COMPUTER

- ★ **MORE SPEED**
10-20 times faster than interpreted **BASIC**.
- ★ **MORE ROOM**
Very compact compiled code plus **VIRTUAL MEMORY** makes your **RAM** act larger. Variable number of block buffers. 31-char.-unique wordnames use only 4 bytes in header!
- ★ **MORE INSTRUCTIONS**
Add **YOUR** commands to its 79-**STANDARD**-plus instruction set!
Far more complete than most **Forths**: single & double precision, arrays, string-handling, clock, graphics, (IBM low-res. gives 16-color or 200-tint display).
- ★ **MORE EASE**
Excellent full-screen Editor, structured & modular programming.
Word search utility
THE **NOTEPAD** letter writer
Optimized for your **TRS-80** or **IBM** with keyboard repeats, upper/lower case display driver, full **ASCII**.
- ★ **MORE POWER**
Forth operating system
Concurrent interpreter AND compiler
VIRTUAL I/O for video and printer, disk and tape (10-Megabyte hard disk available)
Full 8080 or 8088 Assembler aboard
(Z80 Assembler also available for **TRS-80**)
Intermix 35- to 80-track disk drives
IBM can read, write and run **M.3** Disks
M.3 disks can read, write and run **M.1** disks

MMS FORTH

THE PROFESSIONAL FORTH SYSTEM FOR TRS-80 & IBM PC

(Thousands of systems in use)

MMSFORTH Disk System (requires 1 disk drive, 32K **RAM**)
V2.0 Radio Shack **TRS-80** Model I or II \$129.95*
V2.1 IBM Personal Computer, (80-col. screen) \$249.95*

AND MMS GIVES IT PROFESSIONAL SUPPORT

Source code provided
MMSFORTH Newsletter
Many demo programs aboard
MMSFORTH User Groups
Inexpensive upgrades to latest version
Programming staff can provide advice, modifications and custom programs, to fit **YOUR** needs.

MMSFORTH UTILITIES DISKETTE: includes **FLOATING POINT MATH** (**BASIC** ROM routines plus Complex numbers, Rectangular-Polar coordinate conversions, Degrees mode, more), (**TRS-80**) a full **Forth**-style **Z80 ASSEMBLER** plus a powerful **CROSS-REFERENCER** to list **Forth** words by block and line; plus all on one diskette (requires **MMSFORTH V2.0**, 1 drive & 32K **RAM**) \$39.95*

FORTHCOM: communications package provides **RS-232** driver, dumb terminal mode, transfer of **FORTH** blocks, and host mode to operate a remote **TRS-80** (requires **MMSFORTH V2.0**, 1 drive & 32K **RAM**) \$39.95*

THE DATAHANDLER: a very sophisticated database management system operable by non-programmers (requires **MMSFORTH V2.0**, 1 drive & 32K **RAM**) \$59.95*

FORTHWRITE: fast, powerful Word Processor weasy keystrokes, Help screens, manual & demo files. Full proportional w/tabs, outdenting. Include other blocks, documents & keyboard inputs—ideal for form letters (requires **MMSFORTH V2.0**, 2 drives & 48K **RAM**) \$175.00*

MMSFORTH GAMES DISKETTE: real-time graphics & board games w/source code. Includes **BREAKFORTH**, **CRASH-FORTH**, **CRYPTOQUOTE**, **FREEMAN** (**TRS-80**), **OTHELLO** & **TICTACTFORTH** (requires **MMSFORTH V2.0**, 1 drive & 32K **RAM**) \$39.95*

Other MMSFORTH products under development

FORTH BOOKS AVAILABLE

MMSFORTH USERS MANUAL - w/o Appendices \$17.50*
STARTING FORTH - best!! \$15.95*
THREADED INTERPRETIVE LANGUAGES - advanced, analysis of **FORTH** internals \$18.95*
PROGRAM DESIGN & CONSTRUCTION - intro. to structured programming, good for **Forth** \$13.95*
FORTH - 79 STANDARD MANUAL - official reference to 79-**STANDARD** word set, etc \$13.95*
FORTH SPECIAL ISSUE, **BYTE** Magazine (Aug. 1980) - A collector's item for **Forth** users and beginners \$4.00*

* - ORDERING INFORMATION: Software prices include manuals and require signing of a single computer license for one-person support. Describe your Hardware. Add \$2.00 **S/H** plus \$3.00 per **MMSFORTH** and \$1.00 per additional book; Mass. orders add 5% tax. Foreign orders add 20% **UPS** COD, **VISA** & **M/C** accepted; no unpaid purchase orders, please.

Send SASE for free **MMSFORTH** information.
Good dealers sought.

Get **MMSFORTH** products from your
computer dealer or

**MILLER MICROCOMPUTER # 57
SERVICES (B8)**

61 Lake Shore Road, Natick, MA 01760
(617) 653-6136

Basically BASIC

Alphanumerics, variables and assignment statements

Model I/II/III

James A. Conrad, Seattle, WA

Think of a computer as a combination of a high-powered calculator and a smart typewriter. It processes information — numbers like a calculator, letters and words like a typewriter. These two kinds of information have the formal titles *numeric* and *alphanumeric*.

Most of us easily understand the idea of *numeric* information — numbers. We routinely add, subtract, multiply, divide, compute square roots and do a lot of other number manipulation with calculators.

Alphanumeric information is like typewriter characters — letters and numbers. In computer jargon we call this “STRING” information — and we spell STRING with a \$. String information is designated by quotation marks, e.g., “GEORGE”, “2”, “TRS-80”. When the computer sees the quotation marks it knows it's dealing with strings.

Some novice programmers don't understand why an alphanumeric “2” can't be mathematically manipulated like a numeric “2.” Remember typewriter characters — a “2” on a typewriter is just another alphanumeric character, like “L” or “&” or “H” or “?” A typewriter doesn't recognize the character “2” as a number, nor does a computer when it's processing alphanumeric information.

Variables

The computer stores numeric and alphanumeric information in memory cells called *variables*. Numeric variables hold numeric information and string variables contain alphanumeric information. Visualize variables as little boxes in the computer's memory. When

you're trying to figure why a program is being ornery, draw some little variable boxes to show what each variable contains.

Names one or two characters long identify variables. The first character must be a letter — A to Z. The optional second character may be either a letter or a number. We can choose from hundreds of names — from A to Z, from A0 to A9 to Z9, and from AA to AZ to ZZ. Siegfried, my computer, calculated that there are 962 different possible names for either kind of variable (I'm assuming that he understood the program I wrote for him).

Both numeric and string variables use the same set of names but string variables are differentiated by the “\$” string sign following the variable name. String variable A1\$ is called “A one string.” When my son was learning about string variables he continually referred to “X dollar sign” — and I continually corrected him to pronounce it “XString.” I knew I had won when he asked: “Dad, may I borrow five strings?”

Novices sometimes get confused by similarly named variables, such as A, A1, AA, A\$ and A1\$. Each of these is a different variable, related in name only, and each contains information different from the other.

Assignment

An *assignment statement* assigns the value of the expression on the right of the equal sign to the variable named on the left. The most common is the LET statement. Its form is:

LET variable name = expression

The *expression* can be a constant, a variable, or a formula. A few examples:

LET A = 12	(constant)
LET B = A	(variable)
LET A6 = L*W	(formula)
LET G\$ = “Stripper”	(constant)
LET P2\$ = NA\$	(variable)
LET C1\$ = R\$ + “Joe”	(formula)

When the expression is a formula the LET statement calculates its value before assigning it to the variable.

The equal sign in an assignment statement looks like the same equal sign we remember from Algebra I — but it isn't. An assignment statement is not an algebraic equation. In computer language not all equal signs are equal (yes, Mr. Orwell, some are more equal than others).¹

In computer pseudocode a left-pointing arrow shows assignment (LET A ← 12). This reminds us that an assignment statement doesn't use a real equal sign — one which shows equality — instead it assigns the value on the right to the variable on the left with an assignment sign.

The verb “LET” is optional in a LET statement — omitting it won't affect the assignment. The computer recognizes that the statement “J4 = K + BB” is the same as “LET J4 = K + BB.” Beginners, however, should avoid possible confusion by using LET until they are comfortable with both uses of the equal sign. (LET will become mandatory if the proposed national standards for BASIC are adopted.)²

Replacement

Novice programmers often

encounter another algebraic enigma when they assign a new value to an old variable. When I first saw the algebraic aberration $K = K + 1$, I instinctively knew it was wrong. The stern apparition of Miss Simmons, my old Junior High algebra teacher, appeared in my head and said, "Once you've given it a value, a variable is defined and you can't change it."

Not so, Miss Simmons. We're discussing computers, not algebra — assignment statements, not equations. When we assign a value to a variable, *the new value replaces the old*. Use the little boxes mentioned earlier to illustrate this.

	X is Now
10 LET X=2	2
20 LET X=X+2	4
30 LET X=X*X	16
40 LET X=X-6	10

When we assign the value of one variable to another, e.g., LET B=A, What happens to the contents of the variable on the right? They remain unchanged — copied, not transferred, into the variable on the left.

Programming Tips

1. Don't use a variable for more than one purpose in a program if you're a beginner. You could easily misuse it and ambush yourself with mystifying errors.

Experienced programmers, however, often recycle variables to save memory. This requires a systematic approach, such as using the variables A and A\$, A1 and A1\$ for temporary storage; and X, Y and Z for counters or index variables (as in FOR...NEXT loops).

2. Although the computer recognizes only the first two characters of a variable's name, it doesn't complain about longer ones. You can, therefore, create some very descriptive labels, such as NAME\$, ADDRESS\$, SALES and COST. But it's not a good idea. Two reasons:

a. You could accidentally use the same variable for different

purposes. Both FIRSTNAME\$, and FILE\$, for example, use the variable FI\$.

b. A reserved word³ can sneak into a variable name and cause a syntax error when the program executes.

Examples: ORDER, subTOtal, TANDy.

3. List your variables in REM statements at the beginning of your program. This clarifies the program and helps avoid unintentional multiple-use variables.

Include REM statements showing the maximum and minimum limits of numeric variables and the maximum length of string variables. Especially if they're to be printed in columns or stored in fixed length fields.

4. If you use a constant more than once, assign it to a variable. Then you can plug the variable quickly and easily into the program without retyping — and maybe mistyping — the constant. A few examples:

```
LET PI = 3.14159
```

```
LET L1$ = STRING$ (40, "=") :  
REM A 40 CHARACTER DOUBLE  
LINE
```

```
LET M1$ = "MESSAGE ONE"
```

```
LET P1$ = "###.##" : REM PRINT  
USING FORMAT
```

BASIC has three other assignment statements: INPUT, LINEINPUT and READ. They have uses different from LET but they perform the same function — assigning values to variables.

A thorough understanding of numeric and alphanumeric information, the variables that store it, and the assignment statements that put it into the variables will make your programming quicker, easier, and less frustrating. That's BASIC. ■

¹ As we learn more about BASIC we will find another use for the equal sign — as a relational operator testing the truth of an equation. This is generally found in IF...THEN statements (IF A+B=C+D THEN...).

² Thomas E. Kurtz, "On the Way to a Standard BASIC," BYTE, June 1982.

³ See your manual for a list of reserved words.

MAILING LIST SYSTEM

For TRS-80*
(*Tandy trademark)
Model I & III

\$89.95

- Simply to use...even for the novice.
- Maintain virtually an infinite number of disks all in continuous alph. or zip order...essential for large lists.
- Sort **2260** entries (2 full 40 track double density disks) in only 32K or an incredible **4640** entries (2 full 80 track disks) in only 48K!
- Super fast sort by alph. or zip order (8 sec. for 1000 entries)...both orders can exist simultaneously on disk.
- High speed recovery of entries from disk...pulls in over 11 per sec!
- Transfer old files to our system.
- Less than 5 digit zips have leading 0's appended.
- Supports 9 digit zips, **Canadian zips**.
- Zip order is "sub-alphabetized".
- System adjusts to any DOS.
- Backup data disks are easily updated as entries are created, edited, or sorted...extremely useful!!
- Optional reversal of name about comma.
- Permits telephone numbers, etc.
- Prints on envelopes or on labels, 1, 2, 3 or 4 across.
- Test label/envelope printing lets you make adjustments with ease.
- Master printout of your list in several formats.
- Selective printing by specific zips or by zip range.
- Editing is simple and fast...automatic search. Batch transfer of edited entries to backup disks.
- Provides for duplicate labels.
- Deleted entries have "holes" on disk filled automatically.
- Automatic "repeat" feature.
- Load and "scroll" through entries.
- Optional "ATTN:" line.
- Plenty of user defined fields with various options for **simultaneously** purging and selecting the printout.
- All 0's in address labels are replaced by easier to read O's.
- Continuous display of numbers of labels/envelopes printed.
- Each disk entry automatically "remembers" how many mailings have been made.
- Primarily written in BASIC for **easy modification**...embedded machine code for those speed sensitive areas.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

58

Precision Prototypes

410-E East Roca
Refugio, Texas 78377
512-526-4758

RENUM IV your III

Patch the Model I renumber program

Model III

Jerry W. O'Dell, Ph.D., Ypsilanti, MI

A renumbering program is an indispensable tool for the BASIC programmer. However, I was astounded to discover that there is apparently none available for the Model III, certainly none from local sources. There are several versions for the Model I, from various companies, but not for the Model III. Since I really needed the program, I decided to attempt to change the old Radio Shack program, RENUM (Catalog number 26-2004) for the newer machine.

Disassembly of RENUM shows that the change should be fairly easy. The starting address for a BASIC language program in the Model I is 42E9H, and its 43E9H in the Model III. Therefore, if one changes all references to this location (7CA6H, 7D00H, 7D3EH, 7DB9H and 7EACH) from 42H to 43H, the job should be

done. However, it doesn't work. The problem seems to be that the data stored at the highest pointer location, 7FD4H, is destroyed, apparently by the stack. Consequently, one must change the references to 7FD4H to some other value. To be on the safe side, I moved this to just under the beginning location of RENUM, at 7C4AH. The locations that must be changed are 7C6EH, 7CC4H, 7DF7H, 7E0CH, 7E19H, 7E31H, 7E38H and 7E41H. Making this change fixes the problem. RENUM now seems to work perfectly. I've tried it on all sorts of programs, and it seems to function without a hitch.

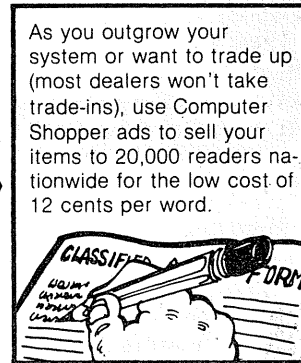
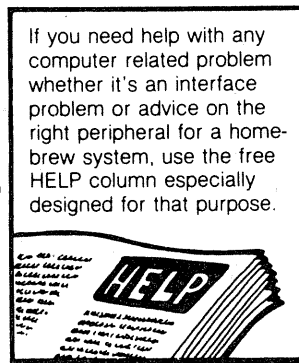
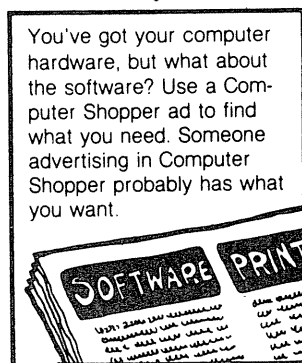
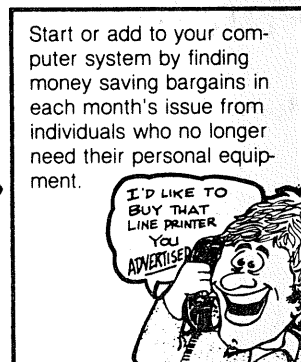
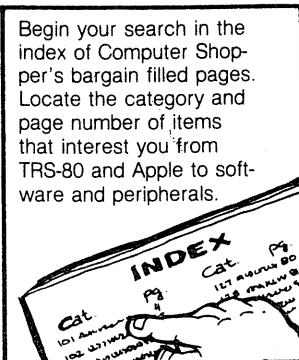
If you have a machine language monitor, like DEBUG or TASMOS, you can make the changes directly, and save the repaired program on tape. If you don't have such a monitor, the little program in Listing 1 will do the job. Load the Model I RENUM into your 16K machine according to the instructions packed with it. However, when the computer comes on, set the MEMORY SIZE? to 31817, rather than 31819, to allow for the two extra bytes needed. Now run the program in Listing 1. It will make the necessary changes in RENUM automatically. RENUM may be left in the computer, and may be recalled at any time by typing SYSTEM (enter), and then /31820 (enter). Unfortunately, with this method, RENUM must be repaired every time the computer is powered up. But it's worth it to have the ability to renumber programs!

Program Listing for RENUM

```
10 POKE 31910,67:POKE 32000,67:POKE 320
62,67:POKE 32185,67
20 POKE 32428,67:POKE 31854,74:POKE 318
55,124
30 POKE 31940,74:POKE 31941,124
40 POKE 32247,74:POKE 32248,124:POKE 32
268,74:POKE 32269,124
50 POKE 32281,74:POKE 32282,124:POKE 32
305,74:POKE 32306,124
60 POKE 32312,74:POKE 32313,124:POKE 32
321,74:POKE 32322,124
```



How to Buy or Sell Computer Equipment and Software



Computer Shopper is THE nationwide magazine for buying, selling and trading Micro and Mini-computer equipment and software. Each issue has over 60 pages full of bargains of new and used equipment.

You can save hundreds of dollars by getting the equipment you need from the hundreds of classified ads individuals place in Computer Shopper every month.

Now is the time for you to join over 20,000 other computer users who save time and money with a subscription to Computer Shopper.

Subscribe today and get your first issue and a classified ad absolutely FREE. Type or print your ad on a plain piece of paper and send it along with your subscription.

Just fill in the coupon or MasterCard or VISA holders can phone **TOLL FREE 1-800-327-9920** and start making your computer dollar go further today.

Cut out and mail to: **COMPUTER SHOPPER**
P.O. Box F115 • Titusville, FL 32780

Yes, I'll try Computer Shopper, I understand that if I'm not satisfied with my first issue I can receive a full refund and keep the first issue free.

- ☐ 1 year \$10.00 (\$30.00 in Canada)
- ☐ I have enclosed my free classified ad.
- ☐ I want to use my free ad later, send me a coupon.

NAME: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP: _____

 **COMPUTER SHOPPER**
P.O. Box F115 • Titusville, FL 32780
Telephone: 305-269-3211

Three C. C. video tips

Switching PMODEs for effect

Color Computer with Extended Color BASIC

Lynn Davis, Clay, NY

Here are some programs that point out various tricks in using the video on the Color Computer. They are all written for 16K Extended BASIC. Two of the programs, "Color the Screen," Listing 1, and "Getting Colored Letters," Listing 2, deal with using signal drift from the computer to the TV while you are in the PMODE 4,1 and SCREEN 1,1 mode. This setup should, but doesn't always, result in a buff/black color configuration. However, the resulting blue and orange colors can be used.

In Listing 3, "Two Circles with One Command," the computer is tricked when a program goes from PMODE 4 to PMODE 2 without inserting a SCREEN command. Anyone looking at the program would assume it would draw three circles, all with a radius of 90. This is not the case — the last circle command actually draws two circles, each with a radius of 45. It also looks to me that both circles are drawn at the same time (although, I don't know how to prove it).

Ed. Note: We had to add line 5 in Listing 3 to make it run on the earlier ROM of the Color Computer. The addition is compatible with all versions.

Listing 1 Color the Screen

```
100 REM TRS-80 COLOR COMPUTER
```

```
110 REM 16K EXTENDED BASIC
120 REM
130 REM
140 CLS
150 PRINT "WHAT COLOR SCREEN DO YOU WANT
?"
160 PRINT " 1. BLUE"
170 PRINT " 2. ORANGE"
180 PRINT: INPUT "TYPE NUMBER & PRESS <EN
TER>"; C
190 IF C<1 OR C>2 THEN 140
200 PMODE 4,1:PCLS:SCREEN1,1
210 FOR X=C-1 TO 256 STEP 2
220 FOR CC=1 TO 2
230 COLOR CC*3,CC
240 LINE (X+CC,0)-(X+CC,192),PSET
250 NEXT CC,X
260 GOTO 260
```

Listing 2 Getting Colored Letters

```
110 REM TRS-80 COLOR COMPUTER
120 REM 16K EXTENDED BASIC
130 REM
```



```

150 CLS
160 PRINT"WHAT COLOR PRINTING WOULD YOU
"
170 PRINT"LIKE TO SEE?"
180 PRINT"1. BLUE"
190 PRINT"2. ORANGE"
200 PRINT:INPUT"TYPE NUMBER & PRESS <EN
TER>";C
210 IF C<1 OR C>2 THEN 150
220 PMODE 4,1:PCLS:SCREEN1,1
230 ON C GOSUB 260,290
240 GOTO 240
250 REM DRAWS A BLUE LINE IF HORIZONTAL
COORDINATE IS AN ODD NUMBER
260 DRAW"S8;BM87,100;U7R4F1D1G1NL4F1D2G
1NL4BR1 BR4 NU7R5 BR4 BU1NU6F1R3E1NU6BF
1 BR4 U7NR5BD3NR4BD4R5"
270 RETURN
280 REM DRAWS AN ORANGE LINE IF HORIZON
TAL COORDINATE IS AN EVEN NUMBER
290 DRAW"S8;BM86,100;BR1H1U5E1R3F1D5G1N
L3BR1 BR4 U7R4F1D1G1NL4F1D3 BR4 U6E1R3F
1D2NL5D4 BR4 U7BD1E1R3F1D6 BR4 BU1U5E1R
3F1D1BD2NL2D2G1L3H1BF1BR4 BR4 U7NR5BD3N
R4BD4R5"
300 RETURN

```

Listing 3
2 Circles with One Command

```

5 PCLS:PCLEAR6
90 REM TRS-80 COLOR COMPUTER
100 REM 16K EXTENDED BASIC
110 REM
120 REM *****
130 REM DRAWS CIRCLE TO SHOW SIZE IN PM
ODE 2
140 PMODE 2,1:PCLS:SCREEN1,1
150 GOSUB 260
160 REM DRAWS SAME CIRCLE TO SHOW SIZE
IN PMODE 4
170 PMODE 4,1:PCLS:SCREEN1,1
180 GOSUB 260
190 REM SWITCH TO PMODE 2 AND DRAW THE
SAME CIRCLE
200 REM NOTE THE CONSTRUCTION OF TWO CI
RCLES WITH ONE COMMAND!
210 REM THIS ALSO MAKES A FAST SMILING
FACE
220 PMODE 2,1:PCLS
230 REM THERE IS NO SCREEN COMMAND HERE
240 GOSUB 260
250 GOTO 250
260 CIRCLE(128,96),90,1
270 FOR T=1 TO 2500:NEXT T
280 RETURN

```

tele-communications

Send E-mail, download programs and files, chat, buy merchandise, access the Source* and other exciting data bases with the MICROCONNECTION, a quality direct connect modem for your TRS-80. The Autodial/Autoanswer MICROCONNECTION automatically dials other computers and answers too! The busdecoding MICROCONNECTION eliminates the need for the RS-232 board, the expansion interface, and the "obsolete" acoustic coupler. Free SMART80 terminal software for the TRS-80 included.

Busdecoding MICROCONNECTION for TRS-80	\$209 00
with Autodial/Autoanswer	\$259 00
RS-232 MICROCONNECTION	\$159 00
with Autodial/Autoanswer	\$199 00
MICROCONNECTION for TRS-80* Color	\$199 00

the microp~~er~~ipheral corporation

2643 151st Pl. N.E., Redmond, WA 98052

(206) 881-7544

* Programs of Link Corp. and Redshift Design, Inc.

60

COLOR COMPUTER SOFTWARE

≡ BASIC AID HELP FOR THE BASIC PROGRAMMER

At last, the development tools you need! All available instantly at power-up.

MERGE COMMAND: Insert programs stored on cassette into your Basic program. You can even assign new line numbers to the file you read in. Create your own tape library!

MOVE COMMAND: Lets you renumber any part of your Basic program. GOTO's, GOSUB's, etc. automatically changed.

AUTOMATIC LINE NUMBERING: You'll love this! Never type in another line number.

PLUS 45 common Basic commands available as single key Control characters. Or change ANY OR ALL keys to your own specifications! Comes with convenient, easy to remove, plastic keyboard overlay. All of this in a convenient ROM cartridge that uses almost none of your valuable memory. CARTRIDGE \$34.95

COLORCOM/E SMART TERMINAL PROGRAM

We didn't wait for the competition to catch up with us! We've added even more features to COLORCOM/E, our superb Smart Terminal program.

- Complete upload & download support
- On line cassette reads & writes
- Automatic capture of files
- Pre-enter data before calling
- Send all 127 ASCII characters
- Word mode eliminates split words
- Off line AND on line scrolling
- Selectable RS232 parameters

We've got the best cassette and upload/download support available. And you can conveniently print any portion of the received buffer you want. NOW ON DISK! Reads and writes files from disk. Same great features plus more. DISK OR CARTRIDGE \$49.95

EDITOR ASSEMBLER DEBUGGER **\$6.95**

CCEAD: This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes, lists to screen or printer. Debugger allows memory examine/modify, program execution. If not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K. CASSETTE \$6.95

STRIPPER: Three valuable commands: (1) Delete Remarks; (2) Pack Lines; (3) Delete Spaces. Fully automatic, is not fooled by GOTO's, GOSUB's, etc. Your programs will run faster and take up much less memory. CASSETTE \$7.95

CUSTOM CARTRIDGES: Put YOUR Basic program into a convenient ROM Cartridge. Runs instantly at power-up. Use for Ad displays, schools, etc. Call or write for info.

Send check, money order,
or Visa/MC Number.
Include \$1 for postage and
handling, Visa/MC Phone
for fast service.

**Eigen
Systems**

P.O. Box 10234
Austin, Texas 78766
(512) 837-4665

61

Reviews

TERM / HOST VER 1.5 (C)1982
--- \$ 34.95 ---

ENTRY / EXIT TERM/HOST via Interrupt Handler
* HEX TRANSLATION of RECEIVED & TRANSMITTED DATA
* TRANSMIT / RECEIVED Data Continually Displayed
* Adjustable SPLIT SCREEN FULL DUPLEX Operation
* BASIC May be Used as a ASCII FILE TEXT EDITOR
* TRANSMIT TEXT from BASIC Without LINE NUMBERS
* BINARY and ASCII FILE Handling Capabilities
* ASCII (Transparent BINARY File) Handling
* CONTROL CODE SUPPORT from KBD or XMIT/RCV BUFFER
* Additional CONVERSION PROGRAMS are NOT REQUIRED
* DISK or TAPE to the TRANSMIT/RECEIVE BUFFER
* TRANSMIT / RECEIVE BUFFER to DISK or TAPE
* DISK to TAPE or TAPE to DISK All File Types
* AUTOMATIC CLEAN UP of RECEIVED ASCII Files
* HEX to DECIMAL CONVERSION From Any USER Program
* UPPER / LOWER CASE DRIVER with KEYBOARD Toggle
* TEXT SPOOL BUFFER for VIEWING or PRINTING
* TRANSLATE TABLE Overlay AREA SWITCHABLE ON/OFF
* LINE FEED Suppression on RCV SWITCHABLE on XMIT
* WAIT for RESPONSE CHR or DELAY After Line TEXT
* EXIT/RETURN to DOS, BASIC or Other USER Program
* HOST May Run MACHINE LANGUAGE or BASIC Programs
in the HOST Mode From Any ASCII REMOTE TERMINAL
* HOST You May DOWN LOAD / UP LOAD all FILE TYPES
in the HOST From Any REMOTE TERMINAL or SYSTEM
* HOST MODE, has PASSWORD PROTECTION if desired
* VERSION runs on MODEL 1 & 3, TAPE or DISK, 4BK

TERM / HOST / BULLETIN BOARD
--- \$ 39.95 ---

* Uses TERM/HOST for a DRIVER with an Appendage
* Series of BASIC Support Programs and DATA Files
* Support about 200 USERS, IDEAL for LOCAL CLUBS
* General, Club, and Confidential PASSWORD Prot.
* EASY, USER ORIENTED, complete UP/DOWN loading
* Auto Config. for N/7/1, N/8/1, E/7/1, or E/8/1

SEND CHECK OR MONEY ORDER TO
Freedom Financial Enterprises of Washington, Inc
3601 Carriage Dr Raleigh, NC 27612 919-787-8082

62

**Programs for Beginners
on the TRS-80**
Hayden Book Co., Inc.
50 Essex Street
Rochelle park, NJ 07662
1-800-631-0856
\$8.95

When I first got my TRS-80 Model I back in the dark ages (of personal computing) in early 1980, I didn't know anything about Beginners All-purpose Symbolic Instruction Code, better known as BASIC. But that didn't matter because Radio Shack had included the very excellent User's Manual for Level I by Dr. David A. Lien. His manual was terrific as a beginners manual, and it successfully taught me the elementary basics of BASIC.

However, I soon found myself in need of more information on how to program in BASIC.

Unfortunately, back in the early 1980s, personal computers were really just beginning to come into their own as a serious new industry that could appeal to more than the trained computer programmer. Consequently, there wasn't much published on learning BASIC that the beginner could understand. So in those days most of us learned BASIC from magazine articles, like those found in fledgling magazines like *80 Microcomputing* or *80-U.S. Journal*.

Today, things are much different. In just two years time (since 1980),

there are other alternatives for learning BASIC after one has absorbed Dr. Lien's BASIC Manual. One of the better texts that I have run across in this regard is *Programs for Beginners on the TRS-80*, by Fred Blechman.

What You Get

Actually, the title is a little misleading, since it implies that it is for beginners, when actually some rudimentary knowledge of BASIC is required. In fact, a better title might be "BASIC After Dr. Lien," or perhaps "Moving Towards Usable BASIC Programs."

So what, you might ask, do you get for your \$8.95? Well, to begin with, you get 150 pages of paperback instruction on writing BASIC programs in Level I or Level II for a TRS-80 Model I. An addendum sheet from the author (for an SASE) will provide you with the few changes required to make the programs given in the book work with the Model III.

But what makes this book so useful for the reader is the clear and concise way that the author leads the reader through each program. Each chapter, and there are 21 of them, contains a BASIC program for both Level I and Level II. Each chapter starts out with a "You'll Learn" section which describes the BASIC commands covered in the program in that chapter. Next

DISCOUNT TRS® 80 COMPUTERS BUY DIRECT

- ✓ No Out-of-State Taxes
- ✓ Large Inventory
- ✓ 100% TRS-80 Equipment
- ✓ Visa or Mastercard Accepted
- ✓ Bank Cashier's Check
- ✓ Bank Money Order
- ✓ Wire Transfers

1-800-835-9056

Kansas Residents

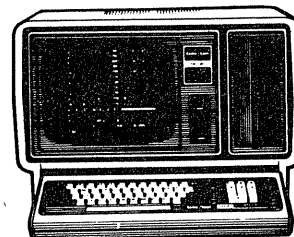
316-624-8610 (Collect)

Call Today For Your
Price List!

Jimscot, Inc.

1023 N. Kansas — Box 607
Liberal, Ks. 67901

63



26-4002
Model II 64K

TRS-80 is a registered Trademark of Tandy Corp.

comes a "Description" section which explains what each program does. Then an "Explanation" section describes how the program works, line-by-line, in real English, not presupposing that the reader has a Masters degree in Computer Science. At the end of each chapter is a list of the variables used in the program in that chapter and what each means.

The result of this format is a tutorial in BASIC for the layman that is clear, and that will find immediate application to other programs that the reader might desire to write.

Some Specifics

Some of the programming techniques covered by the programs in the book include screen prompts, use of strings, branching, use of pseudo-random numbers, ON-GOTO, using subroutines, graphics, use of READ and DATA statements, timing loops, screen and printer formatting, rounding off numbers, using loops and use of arrays.

The author also provides a test program to allow the reader to determine if the top or bottom line of the video display is cut off by incorrect positioning of the display raster. If this is the case, and it certainly is for a number of TRS-80 Model Is, the author describes how to open up the back of the display and readjust the centering tabs on

the CRT. The author also notes that this can be done by adjusting two potentiometers in the Model I keyboard, but warns that this would invalidate the Radio Shack warranty.

At the back of the book are some very useful appendices, including two cassette loading time charts. These tell the reader how long it will take to load a cassette tape if you know the number of bytes, or how many bytes are contained in the program if you know the time it takes to load the tape. In addition there is a design for an Audio/Visual Control Box, which allows you to hear tape signals during record and playback, as well as manually control the motor. There is also an Appendix of "Slick Tricks" which contains some simple programs for keyboard debounce, and a single line program for advancing the tape after recording a program, so that you are ready to start the next recording run on the tape, without having had to manually advance the tape.

For those readers who don't want to go to the trouble of typing in and debugging the programs, the publisher has arranged for a cassette tape to be available for \$10.95 of all of the programs in the book.

So what do you get for \$8.95? A lot of very clear and useful information on how to progress from Dr. Lien's beginning to a more advanced

understanding, with some very useful examples, of BASIC. *Programs for Beginners on the TRS-80* is a good book for the beginning to intermediate BASIC programmer.

Tony Gitt

TRS-80*
Models
I & III



Discount
Prices!

Do you have these best sellers?!

Business	Your Cost Tape / Disk
Mail List (Precision Proto.)	- /71.90
Form Letter (Precision Proto.)	- /31.90
Maxi Manager & Util (Adv. Int.)	- /119.90
Newsprint 7.0 (Prosoft)	- /99.90
Newsprint & Labels (Prosoft)	- /111.90
Games	
Defense Command (Big Five)	12.70/15.90
Stellar Escort (Big Five)	12.70/15.90
Galaxy Invasion (Big Five)	12.70/15.90
Cosmic Fighter (Big Five)	12.70/15.90
Robot Attack (Big Five)	12.70/15.90
Star Fighter (Adv. Int.)	19.90/23.90
Eliminator (Adv. Int.)	15.90/19.90
Dunzhin (Med Sys.)	23.90/23.90
Asylum II (Med Sys.)	15.90/18.30
Laser Defense (Med Sys.)	11.90/14.30
Home/Education	
Little Red Riding Hood (Adv. Int.)	11.90/ -
Old McDonald's Farm (Adv. Int.)	11.90/ -
Money Master (Med Sys.)	11.90/14.30
The Playful Professor (Med Sys.)	11.90/14.30
Personal Check Mgr. (Adv. Int.)	- /19.90

Check reader service for our catalog.

RIMES COMPUTER PRODUCTS

262 Tracey, Dept. 9B
Grand Island, N.Y. 14072
64 (716) 773-2519

Add \$1.50 for shipping. Add \$1.50 for COD.
For fastest service send M.O. or cert. check.
Mastercard/Visa also accepted.
Allow 2 weeks for personal checks.
New York Residents add sales tax.
*TRS-80 is a trademark of Tandy Corp.

OMNITERM

What is OMNITERM?

OMNITERM is a professional communications package for the TRS-80 that allows you to easily communicate and transfer files or programs with almost any other computer. We've never found a computer that OMNITERM can't work with. It's a complete package because it includes not only the terminal program itself, but also conversion utilities, a text editor, special configuration files, serious documentation and serious support.

Why do I need it?

You need OMNITERM if you need to communicate efficiently with many different computers, or if you want to customize your TRS-80 for use with one particular computer. You need OMNITERM to SOLVE your communications problems once and for all.

What do I get?

The OMNITERM package includes the OMNITERM terminal program, four conversion utilities, a text editor, and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can

The ULTIMATE TRS-80 Terminal Package

do for the computer you want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "the best in the industry." And OMNITERM comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using OMNITERM.

What do I need to use OMNITERM?

A Model I or Model III TRS-80, at least 32K of memory, one disk, and the RS-232 interface, or Microconnection modem. OMNITERM works with all ROMs and DOSes, and will work with your special keyboard drivers.

What will it do?

OMNITERM allows you to translate any character going to any device: printer, screen, disk, keyboard, or communications line, giving you complete control and allowing you to redefine the character sets of all devices. It will let you transfer data, and run your printer while connected for a record of everything that happens. OMNITERM can reformat your screen so that 80, 32, or 40 column lines are easy to read and look neat on your TRS-80 screen. It even lets you get on remote computers with just one keystroke! The program lets you send special characters, echo characters, count UART errors, configure your UART, send True Breaks and use lower case. It accepts VIDEOTEX codes, giving you full cursor control. It will even let you review text that has scrolled off the screen! Best of all, OMNITERM will save a special file with all your changes so you

can quickly use OMNITERM for any one of many different computers by loading the proper file. It's easy to use since it's menu driven, and gives you a full status display so you can examine and change everything.

"OMNITERM has my vote as the top TRS-80 terminal program available today" Kilobaud Microcomputing, June 1981, pages 16-19.

OMNITERM is \$95 (plus shipping if COD) Call for 24 hour shipment. Manual alone \$15, applied toward complete package. Visa, M/C, and COD accepted. MA residents add 5% tax. Dealer inquiries invited.

Contact Lindbergh Systems for your custom programming needs. We are expert at writing software to work with YOUR hardware, in assembler, high-level language, or Fortran.

Lindbergh Systems

41 Fairhill Road, Holden, MA 01520 (617) 852-0233

Source: TCA818 CompuServe: 70310267 TRS-80 is a TM of Tandy Corp



From Aspen Software

The Only Complete Document Proofreading System
For CP/M®, TRS-80® and IBM-PC Word Processors

PROOFREADER™

Featuring Random House® Dictionary

- Complete Accuracy—looks up every word; does not use less accurate root word analysis, plus Random House Dictionary
- Full Interactive Correction—standard
- Instant Access to Dictionary
- Compact—Random House Dictionary supplied in sizes to fit your system (50,000 words standard)

GRAMMATIK™

Beyond Spelling Checking

- Detects typos, punctuation and capitalization errors, misused words and phrases
- Analyzes Writing Style
- Suggests Alternative Usages

= NO ERRORS

"The programs together (Proofreader and Grammatik) offer a dynamic tool for comprehensive editing beyond spelling corrections."

--Dona Z. Meilach in Interface Age, 5/82

"Grammatik is the perfect complement to a spelling check program."

--Dr. Alan R. Miller in Interface Age, 5/82

"If you use a word processor and a spelling checker, then you should investigate the unique capabilities of this program. Grammatik is a surprisingly fast and easy to use tool for analyzing writing style and punctuation."

--Bob Loudon in InfoWorld, 12/81

"For the user who is as tight with his dollar as I, Proofreader is the program of choice."

--Stephen Kimmel in Creative Computing, 3/82

"Anyone involved with word processing in any way, whether writing manuals, letters, brochures, news copy, reports, etc. is encouraged to get the excellent program Grammatik."

--A.A. Wicks in Computronics, 6/82

Grammatik and Proofreader are compatible with all CP/M, MS-DOS (incl. IBM-PC), and TRS-80 word processors. Current CP/M formats: standard 8", Northstar, Omikron, Osborne, Apple. Please call/or write for details of minimum system sizes and availability of additional disk and operating system formats. Shipping costs included. Please specify your system configuration when ordering. Dealers inquiries invited.

	Proofreader	Grammatik	Both
CP/M, MS-DOS	\$129.00	\$150.00	\$250.00
TRS-80 Model II	n/a	\$99.00	
TRS-80 Mod. I/III	\$89.00	\$59.00	\$139.00

Random House is a registered trademark of Random House, Inc. Other registered trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; MS-DOS: Microsoft; IBM: IBM; Proofreader, Grammatik: Aspen Software Co.

Aspen Software Co.

P.O. Box 339-E Tijeras, NM 87059
(505) 281-1634



Reviews

**TRS-80 Graphics
For The
Model I and Model III
Byte Books/McGraw-Hill
Publishers
70 Main Street
Peterborough, NH 03458
\$12.95**

I'm sick and tired of hearing from Bob, my Apple-owning friend, about the wonders of hi-res graphics. I, for one, think the TRS-80 computers provide very nice graphics. Sure we don't have control over every single dot, but for the money I don't think you'll find better micros anywhere. And I won't even bother going into the features my new Model III has over the Apple.

Still, it takes a bit of knowledge to get the most out of your computer's graphics. Nevertheless, once you get the hand of programming TRS-80 graphics, you'll be surprised at the images you can get on your display. After all, there isn't an arcade game around that hasn't yet found its TRS-80 equivalent. Anyone who

knocks these machines' graphics just hasn't seen them work under the programming of a master.

TRS-80 Graphics: For the Model I and III is an excellent introductory text to the field. Written in a breezy and generally conversational tone, this book, by authors David A. Kater and Susan J. Thomas, belongs on every TRS-80 owner's bookshelf. It's certainly the most fun computer book I've read in months.

Easy to use and full of practical and imaginative applications, this informative guide provides a full treatment on the uses of graphics in games, education, business, mathematics, statistics, animation and art. Comprehensive in scope, it takes a thorough look at graphics and elementary animation that can be created by using the TRS-80's SET, RESET, PRINT, PEEK, POKE and OUT features. The book even manages to toss in some basic machine language programming, sure to satisfy the requirements of the hardy souls interested in that field.

TRS-80 Graphics is a great way to learn about your computer by doing things that also happen to be a lot of fun. Now please excuse me as I animate myself away from this review and back to my games.

John Edwards

MAINDEX®

Main File Index

MAINDEX is an easy to use, yet thorough program that will aid you in the indexing of your files on disk. Can't find that program you wrote last month? Put your computer to work! Find any file in seconds.

- A main index of all your disks, giving you disk name, free space, dates updated, number of tracks, and disk descriptions.
 - Alphabetizes a list of your files, descriptions and their disk location.
 - Search for files by name, category, or descriptions.
 - Print disk labels with disk name and file names.
 - Runs on both TRS-80 Model I and III.
 - Uses the advanced file capabilities of Apparat's NEWDOS/80.
 - Runs with NEWDOS/80 Ver. 2
 - Includes 14 page easy-to-understand documentation.
 - Labels included to get you started organizing your disks and files
- Requires 48K, 1 disk drive, and NEWDOS/80. On cassette for easy transfer to disk. \$34.95

Add \$1.50 per order for shipping and handling
(California residents add 6% sales tax.)



(415) 388-0238



THE BUISA TRADEMARK OF TANDY CORP. - NEWDOS IS A TRADEMARK OF APPARAT INC.



DEPT EU, PO BOX 591, NOVATO, CA 94948

**The BASIC Handbook
2nd Edition
by David Lien
Compusoft Publishing
1050-E Pioneer Way
El Cajon, CA 92020
(800) 854-6505
\$19.95**

Several years ago, when the TRS-80 Model I was first introduced, the reference manual that was delivered was an easy to read, very simple introduction to computer programming. Professional programmers may have felt that it didn't give them the information they wanted quick enough, but most everyone else who used it just loved it.

The manual has become a classic and has spawned a number of other books by the same author all with the emphasis on simplicity and learning. That author was David Lien. To the average TRS-80 owner,

David Lien's name has become familiar. The BASIC handbook, 2nd Edition, will make it even more so.

The BASIC handbook is an encyclopedia of the BASIC language. It gives possible commands in alphabetical order with one or more pages devoted to expanding on what that command means.

A typical entry (i.e., POKE) includes a discussion of the command, a test program to see how it works, information about sample runs, and information about variations in usage between computers. There are cross references to other commands.

The book is not solely devoted to the TRS-80. It covers BASIC for a large number of computers such as the Apple, Atari, IBM, DEC, Hewlett-Packard, Pet, Northstar and others. Far from clouding over what each command means, this actually makes the handbook a more useful tool.

Have you ever wanted to make a

program written for the Apple work on your TRS-80? Well this is the book to help you do it. Many of the commands include a section on what to do if your computer doesn't have the particular command. For example, MAT INV (matrix inverse) includes a complete subroutine to do the function if the command isn't available (it's not on the TRS-80). The book even has a short section at the beginning which deals with how to convert programs. If you're new to this kind of activity, read it carefully.

The only thing I think he missed is that not enough alternatives are given for commands that are not implemented. For example, INPUT 1 is used to prevent the computer from going to the next line after an input statement. That's a handy command but the book doesn't tell you how to do it.

Overall the book is valuable for general reference, even if you never look at a program from another

computer. It's essential if you're trying to convert programs.

Personally, I like it!

T.R. Dettmann

Defense Command Model I/III

Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
(213) 782-6861

\$15.95 cassette

\$19.95 disk

You lie somewhere between Earth and the Kromorkrom Galaxy. Below you are ten Krontium fuel cells, a very valuable commodity. Until such time as a star cruiser from Earth picks them up, you must defend the fuel cells from the Kromorkrom empire. *Not bloody likely.*

Welcome to Defense Command, the latest sensation from Big Five Software. As the game begins, the Kromorkrom Transporter vessel (which looks like an overgrown

PRIZE WINNING CHESS

— The Finest Available —
See 80 U.S. Journal, June '82

SFINKS 3.0 Prize winner in Paris, plays ruthless chess! Problem set-up, infinite levels of play, 32 book openings, audio alert, printer output, thinks even while you're thinking!

32K Tape or Disk Only \$39.95

SFINKS CHESS TUTOR Step-by-step programmed learning for the newcomer, includes 3-level chess game, problem set-up, printer output, audio alert, and book openings.

32K Disk Only Only \$19.95

SFINKS 1.81 Plays prize-winning chess, pre-chess and transcendental chess, nine levels, problem set-up, audio alert, move suggestion and takeback.

32K Tape or Disk Only \$24.95

Please specify tape or disk and Model I or III. Include \$2.00 shipping and handling.

William Fink (904) 377-4847
1105 North Main, Suite 24-B
Gainesville, FL 32601



67

Gosub International, Inc.

SOFTWARE SOFTWARE

STRATEGY SIMULATIONS FOR THE TRS-80 & COLOR COMPUTER

MERCENARY FORCE

Command a mercenary army. Decide the number of men, type of weapons, armor, air support, medical aid and transports. Battle the enemy in jungles, underwater, on moons and in space (1-4 players)

\$16.95

SPACE MERCHANT

Build an Empire in the stars. Choose your cargo, means of shipping, and security. Risk pirates, ion storms, engine failure and other hazards while you try to become a Space Merchant. (1-6 players)

\$9.95

WARRIOR — Head to head combat in a game where you and your opponent are the rulers of warring city-states, each trying to destroy the other. You decide how many of your population will be warriors, farmers, factory workers and scholars.

\$9.95

YAHTZEE!

\$10.95

GOSUB'S MX80/70 Friction Feed Kit \$49.95 ppd

- Use Single Sheet Paper
- Use Your Own Letterhead

- Use Inexpensive Roll Paper
- Does Not Affect Pin-feed Use

THE PRINTER STAND \$29.95

Kansas residents add 3% sales tax

All prices subject to change without notice

FREE CATALOG UPON REQUEST

(TRS-80 is a trademark of Tandy Corp.)

Dealer Inquiries Invited

SEND CHECK OR MONEY ORDER

Gosub Int'l. Inc.
501 E. Pawnee, Suite 430
Wichita, KS 67211
(316) 265-9992

Gosub of Framingham
P.O. Box 2566
Framingham, MA 01701
(add 5% sales tax)

**The EPSON MX80
NOW WITH HI RES. GRAFTRAX
INCLUDED**

a fully loaded printer at a bare bones price, the world's first disposable print head is rated at 50 to 100 million characters. Few printers can compare with the MX80 at ANY price and NONE in this price range.

NOW your choice of graphics INCLUDED in the price.—COMPLETE—\$455, CABLE \$30

Yes—We also have the MX80FT and the MX100—Call for best price.



CALL FOR COD
(615) 747-5950
P.O. BOX 23101
NASHVILLE, TN.
37202

68

**The
Lawyer's
Microcomputer™**

**A Newsletter for Lawyers
Using the TRS-80***

- Articles for Lawyers
- Law Office Applications
- Lawyer Information Exchange
- Software Reviews
- Hardware Reviews
- Advertisements Directed to Lawyer Users
- Technical Tips
- Letters and Suggestions
- And Much More

**A New Monthly Newsletter
For Lawyers**

Send \$28 For A
One Year Subscription

The Lawyer's Microcomputer™
P.O. Box 1046B
Lexington, SC 29072

*TM Tandy Corp

69

Reviews

tarantula) will release ten aliens, each carrying a precious fuel cell. As they drop to the bottom of the screen to release the fuel cells, a Flagship drops you off. Then, the aliens will return to the Transporter vessel.

After the Transporter vessel vanishes, the game begins. The aliens come from the top of the screen and descend. If you do not shoot them before they reach the bottom, they will grab a fuel canister and go back up. If you shoot them now, they will die and the canister will fall. You must catch it or it will explode. If, for some reason, you were not able to shoot the ascending alien, he and the canister will be gone forever.

Along with the typical crew of aliens, there are two which should be feared more than any other, the Slicer and the Flagship. The Flagship, fortunately, has no laser. If you hit him, he will release a random number of aliens, among which may be the evil Slicer. The Slicer generally makes his appearance when you have only one or two fuel cells left. Its sole purpose in life is to destroy one of your fuel cells. If he makes it down to the bottom of the screen, he will almost certainly accomplish this goal.

If Defense Command were being judged only by its merits as an arcade game, it could only be termed excellent. However, it is being judged as a Big Five game, and as this it just misses. My major

complaint of the game is that it is slow moving. When the game begins, the aliens come down at the rate of one every few seconds. This is more than ample time to exterminate the alien, so the game is fairly monotonous until your score reaches about 20000. Then, the game is well paced.

If not for this one fault, the game would probably come close to Robot Attack in quality. Of course, as in Robot Attack, this game has voice effects. Due to memory limitations, the cassette version has very little voice. On the disk edition, when you shoot the Transporter vessel, a voice booms out "Prepare to die, human." And when you lose a ship, the computer says in a voice that approaches sarcasm, "You're dead!"

If you are seeking to buy a game that will top Robot Attack, then Defense Command is not it. However, if you are just out to have some good, clean fun, then pick up a copy of Defense Command and enjoy!

Matt Friedenberg

EDIT

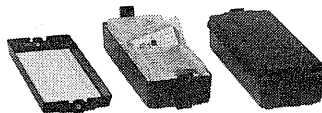
**Model III tape or disk
DCS Software
86 Mansel Drive
Landing, NJ 07850
(201) 398-8281
\$19.95 tape or disk**

Imagine it's toward midnight and you're just putting the final touches on the program of the century that's going to make millions, and much to your dismay you discover a hideous mistake. You've used Tandy as a variable and since AND is a BASIC keyword it's SYNTAX ERROR time in the big city. Wouldn't it be wonderful to have your computer find all the mistakes and be able to correct them on the screen instead of line by line? Now you can, with this new inexpensive utility.

To edit a program using the standard line editor supplied in ROM on all TRS-80s is sometimes a difficult task. An entire set of sub-commands must be mastered and each line of the program must be changed one at a time. However, a full-screen editor, found standard on some computer systems, allows you

SECUR-IT

Stringy File



Secur-It Stringy File storage containers offer safe, no-spill portability and secure, orderly storage for your wafers. High-impact plastic construction. 20 wafer capacity. Black only. \$14.95 ea.

Model I/III Software

- Label Maker, \$12.95 • Page Maker (disk only), \$19.95 • Home Inventory, \$39.95 • Document Maker, \$39.95 •

- Send For Free Catalog
- For Fastest Service Send Money Order Or Certified Check • Add \$2.00 Shipping Charge Per Order • Calif. Residents Add 6 1/2% Sales Tax • All Merchandise Shipped From Stock •

REM Industries, Inc.

9420 "B" Lurline Ave., Chatsworth, Ca. 91311

(213) 341-3719

to make changes within the listing on the screen using cursor controls. This allows changes to multiple lines to be made quickly and without the need for special commands. If a word is spelled wrong, you change the spelling directly on the listing as opposed to entering the EDIT mode, spacing to the mistake, hitting 2C to change two letters, and then finally changing the letters.

Ever hit LIST and then watch the line you wanted to look at scroll by before you could master the SHIFT @ key sequence? This utility also allows you to list your program either forward or backward sixteen lines at a time. The program may also be scrolled forward one line at a time. To me this is a great improvement over the standard listing functions. Program lines may be searched for any string of characters to allow for easy changes of variable names or occurrences of a particular function. Program lines may be inserted between legal numbers or lines may be deleted easily. The program does not

renumber however. Material within program lines may be edited or deleted with easy to learn commands.

The program loads into low memory and takes up less than 2000 bytes. Instead of typing LIST to see your program, you type CMD and now you're in the full-screen edit mode. It's that simple. Pressing the BREAK key returns you to standard BASIC and LIST is still effective if you desire. Documentation consists of five pages, standard notebook size, that contain very clear explanations of all the commands.

If you're like me, you'll find once you use a full-screen editor you'll never go back to a line editor again. This program is a very useful utility and beginning programmers would find its easy editing a great help during the difficult stages of computer learning. It's like having a word processor for writing programs. For ease of operation and function, it's a tough package to beat.

Mark E. Renne

FASTBACK

Model II

RACET Computes
1330 North Glassell, Suite M
Orange, CA 92667
(714) 997-4950
\$75.00

Utility programs are important to most computer users, especially the BACKUP program. Anyone with important information on disk will find it necessary to do BACKUPS frequently. Everyone agrees with that, but many people don't bother with them.

If you ask the question why, it comes down to a matter of inconvenience. BACKUPS take a while to do and if you have to backup several disks, it can be frustrating sitting there watching the computer.

Anyone who works with a computer would agree that any method to make BACKUPS more convenient deserves to be used. FASTBACK falls in that category.

FASTBACK can backup a disk in less than a minute (my tests took

WARNING!

**Electric Power Pollution.
Spikes & Lightning
HAZARDOUS to
MICROCOMPUTERS!!**

Patented ISOLATORS provide protection from ...

- Computer errors cause by power line interference
- Computer errors due to system equipment interaction
- Spike damage caused by copier/elevator/air conditioners
- Lightning caused damage

MONEY BACK GUARANTEE!

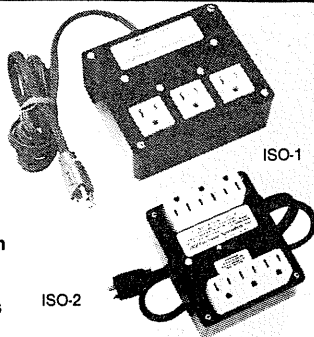
- **ISOLATOR (ISO-1)** 3 Isolated 3-prong sockets; Spike Suppression; useful for small offices, laboratories, classrooms. \$69.95
- **ISOLATOR (ISO-2)** 2 Isolated 3-prong socket banks; (6 sockets total); Spike Suppression; useful for multiple equipment installations. \$69.95
- **SUPER ISOLATOR (ISO-3)** similar to ISO-1 except double isolation & oversize Spike Suppression; widely used for severe electrical noise situations such as factories or large offices. \$104.95
- **SUPER ISOLATOR (ISO-11)** similar to ISO-2 except double isolated socket banks & Oversize Spike Suppression; for the larger system in severe situations. \$104.95
- **MAGNUM ISOLATOR (ISO-17)** 4 Quad Isolated Sockets; Multiple Spike Suppressors; For ULTRA-SENSITIVE Systems in extremely Harsh environments. \$181.95
- **CIRCUIT BREAKER**, any model (Add-CB) Add \$9.00
- **REMOTE SWITCH**, any model (Add-RS) Add \$16.00

AT YOUR DEALERS MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876 (except AK, HI, PR & Canada)

Electronic Specialists, Inc.

171 South Main Street, Box 389, Natick, Mass. 01760

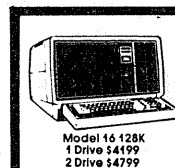
(617) 655-1532



Pat. #4,259,705

From Computer Plus to YOU ...

PLUS after PLUS after PLUS



Model 16 128K
1 Drive \$4199
2 Drive \$4799



Color Computer 16K \$305
w/16K Ext. Basic \$399
w/32K Ext. Basic \$499



Model III 16K \$799
Model III 48K
2 Disk & RS232 c \$1949



Okidata 82A \$425



Color Computer Disk Drive
Drive 1 \$315



Smith Corona TPI
Daisy Wheel \$599

BUY DIRECT Here are just a few of our line offers ... call TOLL FREE for full information.

COMPUTERS		MODEMS		DISK DRIVES	
Model III 4K LEV I	\$3100	Lyrix Direct Connect III/III	235	R.S. Model III 1ST Drive	679
Model III 16K	599	Auto Ans./Dial		Traxx Tandem 40 Track MI	289
Model III 32K	856.50	Telephone Interface II	169	Color Computer Drive 1	315
*Model III 32K	831.50	R.S. Modem I D.C.	130	Color Computer Drive 0	470
Model III 48K	914	R.S. Modem II D.C.	210	Primary Hard Disk	3999
*Model III 48K	864	PRINTERS		ETC.	
Model III 48K		Daisy Wheel II	1695	Verbatim 5" Double Density	32
2 Disk & RS232 c	1949	Smith Corona TPI Daisy Wheel	599	Verbatim 8" Data Life	49.95
*Model III 48K		Epson MX80	CALL	Ch-80A recorder	52
2 Disk No RS232 c	1749	Epson MX80 FT	CALL	C. C. Joystick	22
Color Computer 16K	305	Epson MX100	CALL	16K RAM N.E.C. 200 N.S. chips	15
Color Computer 16K	399	Line Printer VII	249	64K Ram Chips	75
w/extended basic	399	Line Printer VIII	620	Color Computer Flex D.O.S.	99
Color Computer 32K	499	Line Printer V	1610	R.S. Software 10% off list	
w/extended basic	499	Microline 80	325		
*Color Computer 32K-64K	510	Microline 82A	425		
w/extended basic	510	Microline 83A	699		
Packet Computer 2	230	Microline 84 Parallel	1090		
Model 16 1DR 128K	4199	P. C. Plotter Printer	199		
Model 16 2DR 128K	4799				
DI-1 Data Terminal	599				

We have the lowest possible Fully Warranted Prices AND a full complement of Radio Shack Software.

Prices subject to change without notice. Not responsible for typographical errors. 125-80 is a registered trademark of Tandy Corp.



call TOLL FREE 1-800-343-8124

computer plus

480 King Street
Littleton, MA 01460
617-486-3193

Write for our free catalog

72

about 56 seconds for a multi-drive system and about 2½ minutes for a single drive) on the Model II. It steps through the backup process effortlessly and quickly.

As with most of RACET's utilities, FASTBACK does more than just this function. FASTBACK provides the normal backup functions available with the TRSDOS BACKUP, but it also provides the ability to backup disks that have bad directories by using the ALL option. This forces it to copy all tracks on the disk. Some would claim that that's a ridiculous thing to do, but if it's the only copy you've got, you want it.

The options available for FASTBACK are:

Source disk — you can specify the source drive with or without a disk ID.

Destination disk — same as for source.

ABS — backups without worrying about data on the destination disk.

ALL — backups all 77 tracks.

PROMPT — prompts for disk

entry before starting the backup.

NOVER — no verify mode, intended for demonstrations only since it turns off verification of the backup disk.

FASTBACK is not a bit copier. It won't make protected disks available to you for copying. It simply makes your normal, legitimate backups simpler and easier. In my book, that's well worth it.

T.R. Dettmann

**Power Draw
Model I/III
Breeze, Inc.
11500 Stemmons Exp.
Dallas, TX 75229
(214) 484-9428
\$39.95**

Power Draw, by Kim Watt, is a powerful graphic screen editor from Breeze/QSD, Inc. Having reviewed several of Kim Watt's other works, we looked forward with anticipation to taking an in-depth look at Power Draw. We were not disappointed. Power Draw is up to Kim's usual

excellent standards. Supplied on a standard 5¼" diskette as a/CMD file, it works with all known operating systems. From DOS ready, simply type PDRAW to load the program. After loading, a menu appears and Power Draw is readied by pressing ENTER.

There are two modes, graphics and text, and initially you are in graphics mode. A single pixel flashes in the upper left corner to indicate the cursor position. The arrow keys move the cursor, and shifting them speeds them up. There are three modes in graphics: draw, erase and skip. In draw, moving the cursor leaves a lit pixel at the current cursor position. In erase, moving the cursor erases a lit pixel at the current cursor position. In skip, the cursor may be moved without affecting the picture at all. Diagonal lines are not drawn using two arrow keys simultaneously, but a command defines the angle to be drawn, and then the I, O, K and L keys control the direction of the line. A solid or dotted line may be



**VIC-20®
COMMODORE**



victory
SOFTWARE, INC.



**TRS-80
COLOR®
TANDY CORP.**

WE SELL FUN!™



MAZE \$12.95
Trapped inside your computer's memory, you must find your way through the seemingly endless corridors to the outside world. The excellent 3-D graphics will stir up any claustrophobia you may have. Machine code subroutines allow you to move as quickly as you can push buttons.
Plus, there are over 6x10²³ different mazes that the program can generate. There is little chance that you (or your heirs) will see the same maze twice!

ADVENTURES

Adventures are interactive fantasy games in which you solve a mystery by exploring an unknown environment with the assistance of your computer. You tell the computer what to do with plain English commands like "OPEN THE DOOR", and the computer tells you what it sees! Average solving time 6 hours.

Big Bad Wolf \$5.95
NOT for kids only! A full packed adventure based on the Three Little Pigs fairy tale. Don't let the wolf gobble you up!

Computer Adventure \$5.95
Re-live the "excitement" of getting your computer. An adventure with a very different flavor.

Moon Base Alpha \$5.95
You must find a way to destroy the meteor that is racing towards your base, or else all moon colonies will be demolished!

Send for free catalog.
Programs require std. VIC-20 or 16K TRS-80 color computer. All programs on cassette tape.
Ordering—please add \$1.50 postage & handling per order. PA residents please add 6% sales tax.
Mastercard or Visa Charges —Please send account number and expiration date.




73

IBM — XEROX — TRS-80 — CBM
HEWLETT-PACKARD — NORTHSTAR
DEC — HEATH — ZENITH — PMC
OSBORNE — OSI — INTERTEC . . .

WE HAVE



THE CONNECTION

Connect your IBM Selectric®,
IBM Electronic, or Olivetti
typewriter to any Microcomputer.

**UNDER
\$600**



74

ESCON Products, Inc.
12919 Alcosta Blvd.
San Ramon, Ca., 94583
(800) 227-2148 (415) 820-1256

defined.

All commands are single keystrokes while in graphics mode. For example, pressing "U" immediately displays the cursor position in the upper right corner (like the TRACE function in TRSDOS). Pressing "J" displays a grid system to aid in centering figures on the screen. The entire screen may be reversed, with all white characters becoming black and vice versa. To manipulate the drawn figure, you may flip the right and left halves, create a top-to-bottom mirror image, or a right-to-left mirror image. You may also move the entire figure in any direction — useful when creating animated scenes. Single and double-wide video is toggled with another key, as is text entry.

To enter text mode, simply hit "T"; whereupon, the cursor changes shape. Now, text can be entered as on a word processor, with the exception of no line wrap-around. You must manually move the cursor to the start of the next line. All

commands are invoked by pressing CLEAR, together with the letter for the command. There is an additional command, available only in text mode, called the special key. With this command, you can define areas on the screen to either clear, fill, reverse or duplicate with a certain character. All text can be intermixed with graphics; however, video reverse works only on graphics.

The really interesting thing about Power Draw is the way that it stores and recalls the screens that are created. There are up to 34 buffers, depending on memory size. Each buffer holds the contents of one screen. After one screen is created, you can store it in one of the buffers. Return to the workspace buffer, move the picture in any direction, and store the new picture in the next buffer. Continue this process until all the buffers are filled, and then you can watch all the buffers played back in high speed, frame by frame, as if watching a movie! You can even insert a delay between each

frame to slow down the apparent motion. These buffers can be stored on disk or tape, re-loaded into the program, or even accessed and played back by a utility program called PLAY/CMD. You may even string several files together to form a really long "movie." In addition, you may save your screen to disk or tape in BASIC string format, BASIC data format, EDAS format, EDTASM format or DOS load file format.

There are also three separate screen printer drivers included in the program. Of course, these are useful only if one's printer is capable of printing graphics characters. Power Draw also supports the Alpha Products joystick. The program performed flawlessly during evaluation, with no notable bugs detected. This is certainly one of the most useful utilities for a TRS-80 owner to own. Just think how fantastic that title page will look on your next masterpiece, or how about a 2-minute opening movie?

Jim Klaproth

BUY! SELL! TRADE!
COMPUTER & HAM EQUIPMENT

COMPUTER®
TRADER

**PERMANENT
SUBSCRIPTION
\$10.00**

Low Ad Rates — Mailed Monthly

COMPUTER TRADER®

Chet Lambert, W4WDR

1704 Sam Drive • Birmingham, AL 35235

(205) 854-0271

75

Please include your Name, Address, Call Sign or Phone Number

ZORLOFTM

THE MAGNIFICENT

WORD PROCESSING SYSTEM

For the TRS-80* Model I and III



- Written in fast Z80 machine language.
- Full screen editing.
- Single key control of all editing functions for ease of use.
- Dynamic display of word count, line count, and free memory count.
- Hold down repeat on all keys.
- Superscripts and Subscripts.
- Underlined, bolded, expanded, and condensed type styles: combine and intermix within a line.
- Justifies lines to left margin, right margin, both margins, and centered.
- Automatically justifies and word-wraps on the screen as you type.
- Shift and shift lock for upper case.
- Search, Replace, and Automatic Search & Replace.
- Automatic tabbing.
- Odd and even page user-definable headers, footers, and page number lines.
- User-definable linespacing, sheet size, top, left, and bottom margins.

- Move block of text.
- Copy block of text to disk.
- Insert block of text from disk.
- Examine disk directory on any disk and kill files while editing.
- Full screen editing of EDTASM* and BASIC text files.
- Automatic renumbering for EDTASM* and BASIC files.
- Print contents of screen function.
- Print previewing formats text, inserts headers, numbers pages, etc. on the screen without printing it on paper.
- Page by page pausing capability for sheet fed printers.
- Supports both parallel and serial printers.
- Printer control code access.
- Supports proportional spaced justifying on Centronics 737 and Line Printer IV*.
- Also supports special capabilities of Epson MX-80, Microline, Diablo, Starwriter, and Qume printers.
- Can be used with any TRSDOS* compatible disk operating system.

Note: Some features will only work if your printer has the mechanical capability.

GUARANTEE

Many word processing systems claim theirs are the best, but few would dare to guarantee them. Not us! We are confident that you will find ZORLOF to be the most useful word processing system for the money, or you can return it for a full refund, and you may have up to 30 days to decide.

ANITEKTM

ANITEK
Software Products
P O Box 1136
Melbourne, FL 32935
(305) 259-9397

\$70.00

Specify Model I or III when ordering. Add \$2.00 shipping & handling. Florida residents add 5% sales tax. Visa and MasterCard accepted. checks require 3 weeks to clear bank.

*Trademarks of Tandy Corporation and Apparat, Inc.



76

**MICRO-DESIGN PRESENTS
THE MDX-4
PHONE MODEM
P.C. BOARD & USER MANUAL
\$29.95**

- * 300 BAUD
- * DIRECT CONNECT
- * ANSWER AND ORIGINATE MODES
- * SOLDER-MASKED & SILK-SCREENED
- * ON BOARD POWER SUPPLY

MDX-4 PC BOARD & USERS MANUAL \$29.95,
USERS MANUAL 8.95,

(Texas Residents Add 5% Tax)
(Add \$3.00 Shipping for Board)

CALL OR WRITE:

MD

MICRO DESIGN
P.O. BOX 748
MANCHACA, TX 78652
(512) 282-0225



DEALER INQUIRIES INVITED



77

**EPROM
PROGRAMMER**

- * Build your own and save many \$\$'s
- * Complete plans, software & bareboard
- * More features than most costing much more.
- * Programs most popular 5 volt EPROM's

Mod III only, Mod I available soon. Send SASE for full details. Specify mem. size & tape/disk (supplied on tape, transfers to disk). \$39.95

High Desert Engineering
1630 So. Downs
Ridgecrest, Ca. 93555

78

AMRAD

Amateur Radio Research and Development Corporation

AMRAD is a worldwide club of radio and computer amateurs. Activities include:

- Monthly *AMRAD Newsletter*
- Amateur Networking and Protocols
- Computer Bulletin Board System
- Handicapped Education Exchange (HEX)
- Deaf Telecommunications Research
- Spread Spectrum Experimentation
- 2-Meter Voice and Data Repeater

1524 Springvale Avenue
McLean, VA USA 22101

79

BARCLAY WHYTE ASSOCIATES

THE BEAR WITH THE SOFTWARE. TM

TRS-80 MODEL I OR III

WordProc I/III.

VER 2.0 - BASIC MACHINE LANGUAGE WORD PROCESSOR.

MAILING LIST.

VER 2.1 - DISK BASIC MAILING LIST.
FILESTRUCTURE REQUIRES NEWDOS V 2.0
SPECIFY MAIL VERB 2.0 IF DOS NOT AVAILABLE

PRETTY LIST.

FORMATS BASIC PROGRAM LISTINGS

DOCUMENTATION INCLUDES COMPLETE PROGRAM LISTINGS

48K MOD I/III DISK.
EASILY MODIFIED FOR OTHER CONFIGURATIONS

\$14.95 EACH, WITH DISK.
\$10.95 EACH, DOCUMENTATION ONLY.

BARCLAY WHYTE ASSOCIATES, DEPT. D.
549 WEST COLUMBIA STREET.
P.O. BOX 948, NEW WESTMINSTER,
B.C. CANADA. V3L 5C3.

ADD \$1.00 FOR POSTAGE & PACKAGING. ADB05B2
B.C. RESIDENTS ADD PROVINCIAL SOCIAL SERVICE TAX

TRS-80 TRADE MARK OF TANDY CORPORATION.
NEWDOS TRADE MARK OF APPARAT INC.

80

**☆☆ SUPERTM ☆☆
ISA's DATABASE**

The only DBMS with all these features:

- * PROVEN in one year of test marketing
- * TOUGH, reliable file structure
- * MENU driven for simplicity and easy use
- * ARITHMETIC with stored calculations
- * FAST set-up and report formatting
- * CLEAR user-oriented documentation
- * PRINTS totals & subtotals - mail labels
- * REFORMATS and merges data files
- * MULTI-DISK files: Up to 128K records
- * SORTS full disks on up to 40 fields
- * PRODUCTION input of repetitive data
- * COUPLES to word processor & statistics
- * POSTS transactions to master file
- * SEARCH by strings, ranges, comparisons
- * DATA COMPRESSION: Over twice as many labels as the other system

For TRS-80[®] Models I, II, & III - 250.00

CDC
13715 Vanowen Street
Van Nuys, CA 91405
(213) 873-6621

*T.M. Tandy Corp

81

**WHO NEEDS DISKS
FOR RELIABLE, HIGH QUALITY
WORD PROCESSING?**

MOST HOME USERS DON'T!

For long texts or short what you need is TXMODE

TXMODE is a new, sophisticated machine language program that extends ROM edit capability to text material and adjusts line lengths for any desired output format. No limit on manuscript size--has been used to revise a 300-page novel. Commands added to BASIC direct mode, plus many prompts, make proofreading, tape operations and page formatting easy. Works with any printer; special options with Epson MX80.

Model 3, 16K up (Model 1 users please inquire)
\$29.95 + \$2 P&H. FREE BROCHURE.

TOPS Programming Enterprises
QUALITY TAPE OPERATING SYSTEMS
AND COMPATIBLE SOFTWARE FOR HOME USE
7427 S.W. Garden Home, Suite 105
Portland, Oregon 97223

82

Pascal-80 Phelps Gates

This friendly, easy to use version of Standard Pascal, as reviewed in the December 1981 Byte, is now even better! New version works on TRS-80 Model I and Model III, under TRS-DOS, NewDOS, NewDOS 80, DOSPlus, LDOS, and DoubleDOS. An author package allows you to create your own /CMD files without any royalty payments! Upper and lower case is fully supported. You can protect memory and call machine language programs. New extensions include SET, RESET, POINT, RND, and the UCSD Include procedure. Utilities are provided to convert to and from ASCII files. Pascal 80 now comes in a binder with an 80 page manual by George Blank.

With monitor, editor, and compiler in memory at the same time, no other Pascal is easier to learn! One college found that it could teach half again as many students on the same number of computers after switching from UCSD Pascal to Pascal 80.

Full 14 digit accuracy on all math functions, including log and trig functions, makes this a serious Pascal. Disk file handling is supported, with a mail list program included as a demonstration.

Upgrades are available for those who bought Ramware Pascal 80. Call or write for information.

Send \$101 (includes shipping) to: **New Classic Software**
239 Fox Hill Road, B
Denville, NJ 07834

Credit card orders: (201) 625-8838

(PASCAL-80 does not implement variant records, pointer and window variables, or functions and procedures used as parameters)

83

COCO SOFTWARE

COCO MAIL LIST:

Up to 600 names per disk. ML sorts of any field. Plus many more features!

COLOR LEDGER:

A double entry general ledger, which will easily meet the needs of any small business.

COLOR CALC:

Now CoCo can assist you in spreadsheet preparation.

All of the above require:

32K RAM, Disk, and a Printer

PRICES:

\$50.00 each, any 2 for \$85.00,
or all 3 for only \$105.00

ORDER FROM:

NDFS Inc.
S.R. 79, Box 103
Orland, ME 04472

84

MAGAZINE SAMPLES
FREE listing of over 150 magazines offering a sample copy - 50¢ per sample. Send stamped self-addressed #10 envelope to:

**PUBLISHERS
EXCHANGE**

PO Box 1368, Dept 278
Plainfield, New Jersey
07060

*** FAST ***

- * In-Memory Data Base program for Mod I, 48K disk
- * Sophisticated 3 Machine-Language Subroutines:
 1. Sort 1 to 5 Major Fields, carry all Minor Fields
 2. Instring Search on 1 to 2 Fields with as few as 1 character up to an entire Field
 3. Instant Deletion of Record. No waiting on record move-up
- * Any number of Fields & up to 255 characters per Field. Limited only by available memory.
- * Easy Print-out Formatting. Great for Data Storage AND Mailing Lists.
- * Only **\$14.95 + \$2 P&H.**
On Formatted S.D. 35-Trk. Disk.
Check or M.O.

W.H. Sumrall

Rt. 1, Box 142 AB1
Sherman, TX 75090
(214) 532-6565

86

STOP!

Don't throw away your used EPSON MX-80* ribbon cartridges.

We'll reload your cartridges, sell you the ribbon to reload them or if you don't want to bother we'll even buy your used cartridges and sell you brand new ones at reasonable prices.

ALSO AVAILABLE... A reinker that will do the job for less than the retail price of a new cartridge.

We'll also tell you about a device to feed single sheets into most any pin feed printer that costs less than \$4.00.

All sorts of new ideas in the works.
Write today for free information.

Pete Skeberdis

P.O. Box 27
Fremont, Michigan 49412

*EPSON & MX-80 are trademarks of EPSON, Inc.

87

VECTOR/FIX MODEL I/III

- Puts machine language programs on cassette to disk and adds a patch to make them run!
- Ideal for programs which wipe out DOS such as Deathmaze, Eliza, Galaxy Invasion, etc.*
- Scan in uppercase & lowercase ASCII, or HEX — send to printer.
- High speed string search.
- Even patches programs saved to disk by other load module programs (above 81FFH).
- Either version will dump the ROM & DOS area to printer in ASCII or HEX. Min. Req. 32K, 1 disk drive, TRS-80**
- Model I Disk \$19.95**
- Model III Disk \$23.95**

Includes Shipping and Handling

Send Check or Money Order To:

MICRO-MEDIA

P.O. Box 538, Linden, MI 48451

* Not designed to load 'protected' tapes.

**TRS-80 is a trademark of Tandy Corporation.

88

★ ★ BOILER EFFICIENCY ★ ★

Complete mass and energy balance - flue gas composition & more. Versions for natural gas - fuel oils, coal - wood. Determine your boiler's efficiency or see how improved control will improve your fuel efficiency. Specify fuel \$35.00
Version for all fuels \$57.00

★ ★ HEAT EXCHANGER ★ ★

Liquid liquid exchanger evaluator. Fully automated. diagnose problems with existing units. New application for old units. Great for design studies, economic analyses. All coefficients and pressure drops in seconds. Manual included. Specify fluids if not water. Not appropriate for liquid metals. Requires 16K user RAM \$495.00

★ ★ FLUID METERS ★ ★

A package of programs for design of common orifice, variable area, weir, and pitot meters. Also an algorithm for pressure drop in pipe. Manual is included \$259.00

Shipping & handling incl. Model I III required

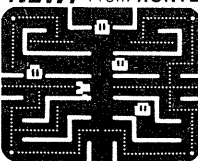
S.M. THORPE CO.

1229 W. 4000 N.

PLEASANT VIEW, UTAH 84404

89

NEW! From RONTEL



—SPOOKS— Rack up points following trails and eating dots — but watch out for the spooks! When you get tough —SPOOKS— will get tougher.

• SOUND
• FAST GRAPHICS
• RECORDS BEST SCORES

—SPOOKS— (cassette, postage paid) .. \$16.95

NEW! From RONTEL

SSBUG Single Stepper

For serious machine code debugging. SSBUG displays all registers and more within a small moveable area of screen. This utility examines and alters memory, breakpoints, and single-steps using a user-selectable key, suppresses following calls, and much, much more. SSBUG is human engineered so as not to interfere with regular program execution. • EASY TO OPERATE • USES ABOUT 2K

SSBUG (cassette, postage paid) \$19.95

Both Programs for TRS-80 MOD. I and III

Send Check or Money Order to:



903 Shady Drive Dept. U Vienna, VA 22180

VA RES. ADD 4% SALES TAX

TRS-80 IS A REG. TRADEMARK OF TANDY CORP.

90

Color Computer Secrets Revealed

Learn all about the secret inner workings of your Color Computer. This new book tells you how to:

- Make back-up copies of machine language programs.
- Merge two or more BASIC programs.
- Increase your memory for free.
- Upgrade your Color Computer to 16K, 32K or 64K RAM & add Extended BASIC
- Run your computer at twice normal speed
- Use a myriad of PEEK and POKE statements. ... and much, much more.

All this in an easy-to-read and profusely illustrated book. A must for every Color Computer owner — just \$9.95 + \$2 shipping. Order direct from:

DISK 'N DATA

5450 Rugby Street
Burnaby, B.C. Canada V5E 2N1

Write for our complete catalogue of Color Computer hardware and software.

92

Save Grief & Aggravation

—Know Before You Buy—

READ

**"Consumer Protection for
the Microcomputer Owner"**

COVERS:

1. Preliminary Considerations before Buying
2. Legal Differences between Mail Order and Local Store
3. Pitfalls and Protection of Paying by Cash, Check, Credit Card, etc.
4. What a Warranty Really Is
5. How to Complain Effectively
6. How to Legally Reject and Revoke Acceptance of Goods
7. Miscellaneous Hints and Suggestions

ONLY \$15 Post Paid (COD \$3 Extra)

Send Check or Money Order to

L. J. KUTTEN, ATTORNEY

201 South Central

P.O. Box 16185

St. Louis (Clayton), MO 63105

314-721-6644

Mo. Residents add 4.625% sales tax
CompuServe ID #70655,376 Source ID# TCK092

93

PAPER

FINEST WHITE BOND

Blank, 1-part, 9 1/2 x 11, 2200 sheets

Letterhead quality paper (20 lb., 25% rag)

Special strip-offs produce smooth 8 1/2 x 11 sheet

WHITE 18 LB. BOND

Blank, 1-part, 9 1/2 x 11, 3000 sheets

Perforated both sides, snaps out to 8 1/2 x 11

GREEN BAR 8 1/2 x 11

1-part, 3200 sheets, 15 lb. stock

CARBONLESS 9 1/2 x 11

2-part, 1600 sheets, 15 lb. stock

Perforated both sides, snaps out to 8 1/2 x 11

Send check with order. Add \$6.00 per box for handling and shipping (UPS) within continental US. Calif. residents add 6 1/2% sales tax. Satisfaction guaranteed.

Call or write for free catalog and samples.

BOB'S CHARTS
Computer Paper Dept.

405 E. THIRD, SUITE 206B
LONG BEACH, CA 90802
(213) 435-3492

94

New Products

Portable Model III

The Adcock & Johnson Model 3000 is a conversion which transforms the Radio Shack TRS-80 Model III from a desktop into a fully portable computer. The Model 3000 is the first portable computer to be fully compatible with the broad range of software and hardware already in use and under intense development for Radio Shack computers.

Offering a rugged, brushed aluminum case, dual 184K disk drives and optional internal direct connect modem, the Model 3000 incorporates a large nine-inch, green phosphor CRT, with a anti-glare finish for easy viewing. The unit weighs only 28 pounds.

The Model 3000 is available either as a conversion for a Model III at \$795 or as a complete machine for \$2895. Internal 10 Meg hard disk, modem and upgrades for Model III owners are available at additional cost. For more information, contact Adcock & Johnson, Drawer 8778, Fort Worth, TX 76112, (817) 429-5131.

200

Communications Program

Term/Host is a comprehensive self-contained communications program designed for Model I or II with 48K of memory, disk or tape. The same version runs on all configurations. The program handles all types of files in binary or ASCII modes. Term/Host supports complete remote operation of the user's system. As a host, you may run machine language or BASIC programs, or down/up load files from any remote terminal or system. The program is menu driven, includes a 27-page users guide, and is priced at \$34.95.

Term/Host Bulletin Board uses Term/Host for a driver with an
108 80-U.S. Journal



Weighing only 28 pounds, the portable Model 3000 from Adcock & Johnson is fully compatible with the broad range of software and hardware.

appendage. It includes a series of BASIC support programs, and data files, supports about 200 users; has general, club and confidential password protection; complete up/down loading; auto UART configuration. One disk drive with 48K is the minimum requirement. The appendage and support programs are priced at \$39.95.

Both programs are distributed by Freedom Financial Enterprises of Washington, Inc., 3601 Carriage Dr., Raleigh, NC 27612, (919) 787-8082.

201

Computer Consumer Protection

A 35-page booklet *Consumer Protection for the Microcomputer*

Owner covers the steps to consider before purchasing a computer. Information about the general Law of Sales is given to advise buyers of the legal issues that can arise if he is not careful, such as: When is a sale valid? Are advertised prices binding? What can be done about partial delivery? What and when must the seller deliver? Hints on how to legally reject and revoke a prior acceptance of a product are included. There are suggestions on how to complain effectively and hints every computer purchaser will find useful. The booklet is available by mail for \$15.00 from L. J. Kuttan, Attorney at Law, 201 S. Central Avenue, P.O. Box 16185, St. Louis, MO 63105.

202

C.C. Audio Spectrum Analyzer™

Radio Shack is now providing audiophiles and high fidelity enthusiasts with a new way to use the TRS-80® Color Computer as a test instrument or as a colorful aid to their audio systems. Audio Spectrum Analyzer™ (26-3156), available for \$19.95 at Radio Shack stores, provides a colorful, graphic display (of the power-frequency distribution) of energy in sound presented to the computer's cassette port input. Color bargraphs show the relative power distribution over a nine-octave audio range. Both fast-response (peak measurement) and slow-response (RMS measurement) modes are available. A cable is required (e.g., Radio Shack 26-1027, not included) for connection of the audio source to the Color Computer cassette input port.

203

Portable Data Terminal

Radio Shack is introducing a new portable printing data terminal. The TRS-80 PT-210 Portable Data Terminal (76-1001) is available for \$995. The terminal includes a full typewriter keyboard, a thermal

printer and a 110/300 baud (Bell 103A compatible) acoustic telephone coupler.

An optional add-on RS232C Interface Module (76-1002), available for \$69.95, can be user (plug-in) installed. This facilitates use of the terminal as a local (to a computer or selected peripheral) "front end" dumb terminal and/or printer. RS232C is also a convenient way to connect the terminal to a direct connect modem.

The PT-210 features a full-sized ASCII keyboard, generating a total of 99 codes, and offers a switch-selectable digital keypad. 110 baud or 300 baud operation may be switch selected, as may half-duplex or full-duplex operation and odd-parity / even-parity / no-parity modes. The PT-210 is housed in silver-grey case measuring 15½ x 14½ x 5 inches, and weighing 15 pounds with paper installed. It is FCC registered, and UL-listed for 120 VAC 60 Hertz operation. The line cord is detachable for easy portability. A light duty black vinyl dust cover and one roll of paper are included. A travel case (76-1010) is available separately for \$24.95.

204

Speed-up Peripheral

The Sprinter™ is a speed-up peripheral that will run your system two to three times faster, plugs inside your keyboard, and lets you add a parallel printer. You select from 16 different (OUT) software commands that control execution speed. The Sprinter automatically slows down for disc and I/O operations, and compensates for slow ROMs. For high speed performance, a Z80B is included.

Designed to plug into the Z80B socket inside TRS-80 Models I/III and PMC-80/81, the Sprinter is the first speed-up that doesn't require technical know-how to install and remove. The Sprinter can be purchased for \$99.50. Add \$24.50 for a parallel printer port and \$19.50 for a printer cable. The Sprinter is available from Holmes Engineering, Dept. #20, 3555 South 3200 West, Salt Lake City, Utah 84119, (801) 967-2324.

205

TRS-80 Graphics Book

TRS-80 Graphics (62-2073), by J. D. Robertson and John P. Grillo, is available for \$7.95 at Radio Shack stores, Computer Centers and participating dealers. The book provides sample programs and illustrations for three general methods of generating computer graphics—character graphics, pixel graphics and line printer graphics.

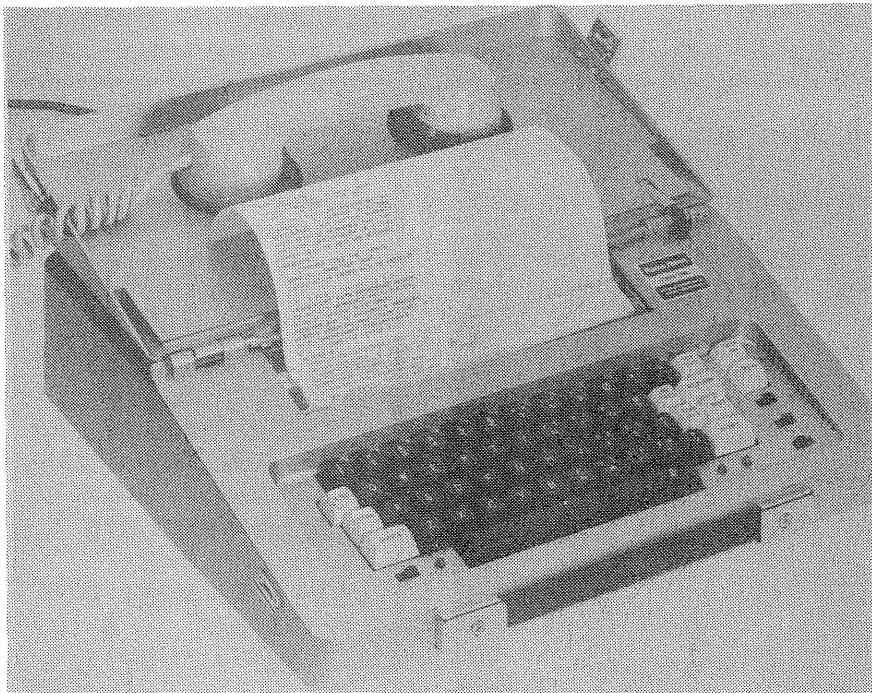
206

Disk File Index

"Maindex," and its sort program "Alphadex," is an easy to use, yet thorough program that will aid you in the indexing of your files on disk. With Maindex you will know the disk containing any file within seconds. Files can be located and reviewed by name, partial name, user defined categories, or by scanning the file descriptions.

Maindex for the TRS-80 Model I or III, requires 48K, at least one disk drive, and NEWDOS/80. Distributed on cassette with over 14 pages of easy to read documentation, Maindex does all this for \$34.95. More information is available from E-Z Software, P.O. Box 591, Novato, CA 94948.

207



Radio Shack's TRS-80 PT-210 Portable Data Terminal consists of a keyboard, thermal printer and 110/300 baud acoustic telephone coupler.



ABS Suppliers
3352 Chelsea Circle
Ann Arbor, MI 48104
(313) 971-1404

B17 TAPE OPERATING SYSTEM will let you

- Save & Load programs 6X faster than Model-1.
- Save & Load Data Arrays over 800X faster.
- Backup standard System tapes that load-n-go.
- Certify cassette tapes for B17 use.

\$14.95 Specify Model 1/3 16K/32K/48K RAM.
Inexpensive Upgrades available. 3rd year of sales.

B17 DISK/BAS is a Disk version. Lets you save any disk file to cassette at 3000 baud. Inexpensive way to backup your files. Works with any DOS. Includes tape certifier. Requires 32K RAM-up.
\$14.95 Specify Model 1/3.

WORDSMITH Word-processing program in BASIC. A 'Trainer' for more complex W/P programs. Easy-to-use. Specify Tape/Disk version. Tape version requires B17 Tape Operating System (above). Disk version requires 32K RAM-up. Uses MX-80 Printer.
\$14.95 Specify Model 1/3.

Add \$1.50 postage/handling per item.

95

DID YOU BUY YOUR COMPUTER TO HELP
YOU MAKE OR SAVE MONEY?

BISPLAN

Is for the person wanting to start a small business. Or for the person who is operating a small business. You enter all the financial information pertaining to your business plans and BISPLAN will produce PROFIT & LOSS STATEMENTS, CASH FLOW ANALYSIS and BALANCE SHEETS. Each projected for up to 5 years. BISPLAN will also indicate financing needs. Printed output suitable for loan applications, business proposals, etc. "What if" ideas tested. Entries easily changed. Ideal for small business proposals as well as for projecting existing business expectations.
INTERACTIVE. COMPREHENSIVE.
NEW - Store data on tape or disk.

On cassette: Specify Mod I or III, 16K
32K, 48K — \$59.95

Single Source Solution
2699 Clayton Road
Concord, CA 94519

98

MICRO MOONLIGHTER NEWSLETTER

The **ONLY** publication devoted exclusively to helping you create, build, and maintain a home-based business using your micro-system. **SUBSCRIBE NOW** to what may be the most important publication in **YOUR FUTURE!**

1 Year (12 issues) only \$25 U.S.,
\$29 Canada, \$35 World Wide

J. Norman Goode, Publisher
**Micro Moonlighter
Newsletter**

2115-J Bernard Avenue
Nashville, TN 37212

Visa and Mastercard welcome. Send account number and expiration date.

101

DISKETTES CASSETTES

Error-Free 5 1/4-inch Diskettes (MD-5) single-sided, soft sector, single or double density, reinforced hub.

Item	Qty 10	Qty 50
MD-5	\$25.00	\$110.00
C-10	\$ 7.50	\$ 32.50
C-20	9.00	39.00
C-60	11.50	50.00
C-90	15.00	70.00

UPS SHIPPING INCLUDED
in Continental USA
CA Customers add taxes

MICROSETTE

475 Ellis St., Mt. View,
CA 94043 (415) 968-1604

96



Micro-Grip™
FRICTION FEED FOR YOUR EPSON
MX-70* or MX-80*

*MX-70 and MX-80 are Trademarks of EPSON Inc.

- Converts your printer for friction feed of SINGLE SHEETS or ROLL PAPER.
- SIMPLE Installation (all you need is a screwdriver, no soldering).
- Tractor feed remains undisturbed:
- Only **\$39.95**
(add \$1.50 for postage)



SATISFACTION GUARANTEED OR YOUR MONEY BACK


VISA & Master Card Accepted


MICRO-GRIP, Ltd.
P. O. Box 4278
Norton AFB, CA 92409

99

Eight good reasons
for using a **Mod III:**

1. **Minibiz** (tm) General Ledger Accounting System
2. Accounts Receivable
3. Accounts Payable
4. Full-Service Payroll
5. Order Entry & Invoicing
-with Inventory Interface
-with Accts. Rec. Interface
6. Fixed Assets Accounting
7. Job Cost Accounting
8. Cost Estimating Systems
-for Manufacturing
-for Food Service

At selected Dealers or
from the publisher

Nepenthe Programs
44 Third Ave., Ste. F
Chula Vista, CA 92010

97

COLOR COMPUTER COLORFORTH

FORTH is a high level computer language like BASIC or PASCAL. **COLORFORTH**, a version of figFORTH, is available NOW for the TRS-80C computer. **COLORFORTH** execution time is as much as 10 times faster than BASIC. **COLORFORTH** requires a minimum of 16K ram, but does not require either Extended Basic or disk system. When you purchase **COLORFORTH**, you receive both cassette and disk versions, the standard figEDITOR, and an extensive instruction manual.
ALL FOR ONLY..... \$49.95



Armadillo Int'l Software
P.O. BOX 7661 PH. (512) 459-7325
AUSTIN, TEXAS 78712

100

Professional REAL ESTATE SOFTWARE

for APPLE, TRS-80 & CPM SYSTEMS

• PROPERTY MANAGEMENT SYSTEM: \$375

- Tenant History
- Late Rent Report
- Vacancy Report
- Income Report
- Auto Late Charge
- Returned Checks
- Operating Stmt.
- Building Reports
- Utilities Report
- Tax Expense Report
- Prints Checks
- Prints Receipts

• PROPERTY LISTINGS/COMPARABLES: \$325

- SCREEN BY —
- 22 Items/Listing
 - 1000 Listing/Disk
 - Listing Memo Field
 - Max/Min Price
 - Units/Zone/City
 - Max Price/Income
 - Max Price/Sq Foot
 - Min Cashflow

• REAL ESTATE ANALYSIS MODULES: \$50/Module

- Home Purchase
- Income Prop Analysis
- Property Sales
- Construction Cost/Profit
- Tax Deferred Exchange
- APR Loan Analysis
- Loan Amortization
- Depreciation/ACRS Analysis

• WORD PROCESSOR — MAGIC WAND: \$265



At Computer Stores Everywhere
or Order COD Direct
Cal Residents add 6% Sales Tax
(213) 372-9419

Suite E, 1116-8th Street, Manhattan Beach, CA 90266

102

COLOR SOFTWARE

BERSERK.....\$30.95
COLOR TREK...\$34.95
COLORTERM...\$40.95
MOON LANDER...\$19.95
PAC ATTACK...\$30.95
TELEWRITER...\$61.95
IN CANADIAN DOLLARS
WRITE FOR CATALOGUE

COLOR PRODUCTS UNALIKE

#211 990 EAST 8TH
VANCOUVER B.C.
(CANADA) V5T-1T8
PH. (604) 873-2372

103

RSN	Advertiser	Page
33	Aardvark-80.....	63
95	ABS Suppliers.....	110
10	Access Unlimited.....	20, 21
6	Ace Computer Products of Florida.....	11
200	Adcock & Johnson.....	108
107	Aladdin Software.....	111
20	Algorix.....	41
16	Alpha Products.....	32
79	Amrad.....	106
76	Anitek Software.....	105
1	Apparat.....	Cover 2
100	Armadillo Internat'l. Software.....	110
★	Aspen Software Co.....	100
80	Barclay Whyte Assoc.....	106
39	Binary Devices.....	70
94	Bob's Charts.....	107
115	Business Division, The A Div. of Scott Adams, Inc.....	Cover 6
81	CDC.....	106
31	Chromasette Magazine.....	59
30	CLOAD Magazine, Inc.....	59
111	Clough, Eric.....	111
103	Color Products Unlike.....	110
56	CompuKids.....	87
32	CompuSoft Publishing.....	61
22	Computer Applications Unltd.....	47
18	Computer House.....	35
72	Computer Plus.....	103
59	Computer Shopper.....	95
75	Computer Trader.....	105
17	Computerists Directory, The.....	33
48	Computerists Directory, The.....	80
13	Comtronic Systems.....	27
53	Cornucopia Software, Inc.....	84
104	CRB Microtools.....	111
112	Dental Computer Newsletter.....	111
92	Disk 'n Data.....	107
110	EAP Company.....	111
61	Eigen Systems.....	97
★	80-N.W. Books.....	67
71	Electronic Specialists.....	103
19	Epson America, Inc.....	36, 37
74	Escon Products.....	104
108	Excellonix.....	111
66	E-Z Software.....	100
207	E-Z Software.....	109
67	Fink, William.....	101
201	Freedom Financial Enterprises.....	108
62	Freedom Financial Enterprises.....	98
21	Freedom Technology International.....	43
★	Gosub International, Inc.....	101

43	Hacks.....	74
78	High Desert Engineering.....	106
205	Holmes Engineering.....	109
25	Holmes Engineering.....	53
★	H. W. Electronics.....	7
2	IJG.....	Cover 3
37	Insiders Software Consultants, Inc.....	68
109	J/C Enterprises.....	111
44	J. F. Consulting.....	75
63	Jimscot, Inc.....	98
93	Kutten, L. J., Attorney.....	107
202	Kutten, L. J., Attorney.....	108
24	KWIK Software.....	51
29	Langley Systems, Inc.....	Center 4
69	Lawyer's Microcomputer, The.....	102
117	Leading Edge, The.....	Cover 8
24	Lemons Tech Service.....	51
65	Lindbergh Systems.....	99
3	LNW Research Corp.....	1
114	LNW Research Corp.....	Cover 5
46	Marathon Software.....	76
41	Marymac Industries, Inc.....	72
84	MDFS, Inc.....	106
55	Micro Architect, Inc.....	86
23	Micro Data Supplies.....	49
77	Micro Design.....	106
99	Micro Grip.....	110
14	Micro Labs.....	29
15	Micro Labs.....	29
88	Micro Media.....	107
101	Micro Moonlighter Newsletter.....	110
35	Micro Systems Software, Inc.....	65
113	Micro Technology.....	112
11	Micromint, Inc.....	24
60	Microperipheral Corp., The.....	97
96	Microsette.....	110
4	Microsoft Consumer Products.....	5
57	Miller Microcomputer Services.....	91
38	Misosys.....	69
97	Nepenthe Programs.....	110
83	New Classic Software.....	106
40	Nocona Electronics.....	71
26	Oasis West.....	55
★	Percom Data Co.....	Cover 4
42	Perry Oil & Gas, Inc.....	73
27	Plus Computer Technology.....	Center 1
34	PMC Software.....	64
58	Precision Prototypes.....	93
7	Program Store, The.....	12, 13
8	Program Store, The.....	15
9	Prosoft.....	19
★	Publishers Exchange.....	106
203	Radio Shack.....	109
204	Radio Shack.....	109
206	Radio Shack.....	109
28	Radio Shack.....	Center 2, 3
116	Radio Shack.....	Cover 7
45	Rainbow, The.....	76
102	Realty Software Co.....	110
70	REM Industries.....	102
54	REMarkable Software.....	85
64	Rimes Computer Products.....	99
90	Rontel Corp.....	107
105	Scientific Engineering Labs.....	111
98	Single Source Solution.....	110
87	Skeberdis, Pete.....	107
106	SoftHart Enterprises.....	111
36	Software Options.....	66
5	Software Plantation.....	9
12	Software Support.....	25
91	StarWare.....	107
86	Sumrall, W. H.....	107
68	Suncoast Records & Data, Inc.....	102
49	Szygy.....	80
50	T & D Software.....	81
89	Thorpe, S. M., Co.....	107
82	TOPS Programming Enterprises.....	106
47	Transaction Storage Sys., Inc.....	79
51	Twenty-first Century Club.....	82
73	Victory Software.....	104
52	Wiley, John and Sons.....	83
★	Contact these advertisers directly.	

This bulletin board space is available free to individuals with single or unusual items for sale or trade, and for other announcements of interest to the general readership of this magazine. 80-U.S. Journal reserves the right to reject any commercial advertising in this section and suggests using our display advertising for that purpose.

These notices are free of charge and will be printed one time only on a space available basis. Notices will be accepted from individuals or bona fide computer user clubs only. All announcements must be typed, contain 75 words or less and include complete name and address.

Michael B. Shane, Chairman of Leading Edge Products, has announced that one cent from the sale of every Elephant diskette sold throughout the world will be contributed to the Jimmy Fund. The Jimmy Fund has long been a source of aid and comfort to parents of children unfortunate enough to develop cancer. The Fund's contributions to the Sidney Farber Cancer Institute for the past 35 years, has meant life to many of these children, and could someday be a major force in funding the research leading to a cure of many forms of cancer. They expect sales to continue substantial growth, benefitting the fund and the Institute.

Rimes Computer Products announces its Grand Opening. Major brands of business, home, personal and entertainment software will be sold at discount prices. Many popular models of computers will be supported, beginning with Radio Shack's TRS-80 Models I and III. A free catalog may be obtained by writing to them at 262 Tracey, Grand Island, NY 14072.

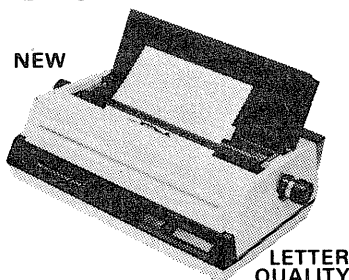
FOR SALE: BYTE — Jan. 79, Apr. 79 to Apr. 81, Jul. to Oct. 81, Dec. 81, Jan. 82, Apr. to Jun. 82. \$1.50 (\$3.50). *Creative Computing* — Apr. 79 to Jul. 79, Sep. 79 to Oct. 81, Dec. 81 to Aug. 82. \$1.50 (\$3.00). Prices in parenthesis include postage. Excess postage will be refunded on multiple orders. Call Douglas Stewart, 15 Mountain View Road, Cape Elizabeth, ME 04107, (207) 767-2351.

The Southern Maine TRS-80 Group, 15 Mountain View Road, Cape Elizabeth, ME 04107, meets the first Tuesday of every month at 6:30 p.m. in Classroom 2, Maine Medical Center, Bramhill Street, Portland, ME 04102. Dues: \$10 per year/\$1 per month. Newsletter: Byte Babble.

FOR SALE: (1) Unique, original computerized football game. 16K program lets you play against computer or a friend. Situations include fumble, safety, interceptions, on-side kicks, graphics, and more. (2) Thoroughbred horse-racing. Excellent action graphics, timer, daily-double wagering. \$10 per game or both for \$18 ppd. TRS-80 Model I/III cassette or disk, 16K required. For order or comprehensive free information, write: Douglas Hayman, 20 Redwood Drive, Great River, NY 11739, (516) 277-9850.

DAISY WHEEL PRINTER

NEW

LETTER
QUALITY

- RS232C, Serial Interface
- Parallel Interface
- Microprocessor Controlled

\$645

MICRO TECHNOLOGY
7817 Ivanhoe Ave
La Jolla, CA 92037
(714) 457-2149

GALAXY OF FEATURES

A **GALAXY** of features makes the **LNW80** a remarkable computer. As you explore the **LNW80**, you will find the most complete, powerful, ready to run, feature-packed personal and business computer ever made into one compact solid unit.



MODEL I COMPATIBILITY – The **LNW80** is fully hardware and software compatible with the Model I. Select from a universe of hardware accessories and software – from VisiCalc® to space games, your **LNW80** will launch you into a new world of computing.

FULLY LOADED – A full payload includes an on-board single and double density disk controller for 5 1/4" and 8" single or double sided disk drives. RS232C communications port, cassette and parallel printer interfaces are standard features and ready to go. All memory is fully installed – 48K RAM, 16K graphics RAM and 12K ROM complete with Microsoft **BASIC**.

QUALITY CONSTRUCTION – Instrumentation quality construction sets **LNW80** computers apart from all the rest. Integrated into the sleek solid steel case of the **LNW80** is a professional 74-key expanded keyboard that includes a twelve key numeric keypad.

HIGH RESOLUTION GRAPHICS & COLOR – The stunning 480 X 192 resolution gives you total display control – in color or black and white. The choice of display formats is yours; 80, 64, 40 and 32 columns by 24 or 16 lines in any combination of eight colors.

PERFORMANCE – Lift-off with a 4MHz Z80A CPU for twice the performance. The **LNW80** outperforms all computers in its class.



Our down to earth price won't send you into orbit

LNW Research Corp.

2620 WALNUT Tustin, CA. 92680
(714) 641-8850 (714) 544-5744

PLEASE ANSWER THESE 5 QUESTIONS

- | | YES | NO |
|---|--------------------------|--------------------------|
| 1. Do you have information that must be kept organized and accessible? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Do you ever need to perform statistical analyses? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Would you like to have a tool that will allow you greater flexibility in managing your own or your company's money? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Could you use a mail list program that will be easy to use, maintain an unlimited number of names, allow you great sorting flexibility, and even interact with a word processor? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Do you own or have access to a TRS-80 microcomputer? | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered "yes" to any of these questions, we can be of assistance to you. Our Maxi Series of applications programs are designed to give you maximum versatility with a minimum of hassle. These programs were created for business use, but you'll find yourself using them for personal applications as well.

Thorough support — Of course, each program comes with in-depth, user-oriented documentation, and is menu-driven to make it easy to use. When necessary, the Maxi programs are compatible with each other, and, whenever pertinent, are interactive with the major word processing and spreadsheet programs published by other manufacturers. Also, we maintain a telephone support line to provide you with any assistance you might require.

Maxi Manager by Dale Kubler

Maxi Manager is a remarkable data base manager. Its fast machine language sort complements its large data storage capacity. The sophistication of its data entry, management, and printing capabilities makes Maxi Manager a versatile tool for many applications.

The program now includes Maxi Utility, which allows you to rescue files on diskettes that have been damaged by excessive wear or misuse and lets you expand, add, or delete fields from an existing data base. Let the unmatched capabilities of Maxi Manager handle your data management!

Model I & Model III. Minimum 1 disk drive required 012-0196 \$149.99

Maxi Mail by Dale Kubler

Maxi Mail is a powerful mail list management system that:

1. Is easy to use.
2. Has virtually unlimited storage capacity.
3. Interfaces with the major word processors to generate form letters and other text.
4. Prints mailing labels up to four-across in any format desired.
5. Has virtually unlimited coding capabilities with thirteen fields of information for each record.

Maxi Mail is the most sophisticated user-oriented mail list program available.

TRS-80 Model III only. 2 disk drives required 012-0148 \$99.95

Maxi Cras by Dale Kubler

(Check Register Accounting System)

Maxi Cras is a system that will computerize check writing, recording and analysis for business and personal finance. The system features 223 income and expense accounts, each of which will handle an unlimited number of transactions. Extensive register and report printing capabilities make Maxi CRAS an indispensable tool for managing money effectively.

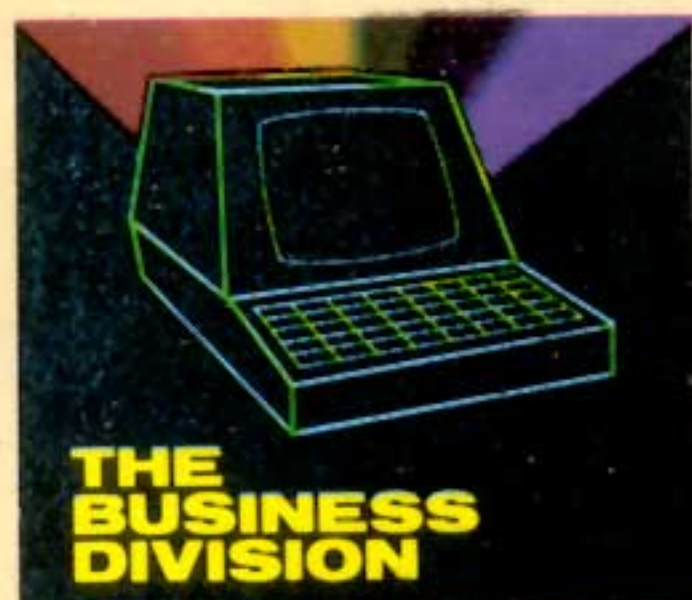
Model I & Model III. Minimum 2 drives required 012-0145 \$99.95

Maxi Stat by David Walonick

Maxi Stat is the most useful statistical analysis package on the market today. It was developed to allow maximum flexibility in designing customized analysis. Maxi Stat handles the three main components of statistical analysis:

1. Complete menu-driven codebook creation and editing.
2. Menu-assisted data entry.
3. User-created control files to describe the statistical analyses to be performed and printed out on the variables of your choice.

Model I & Model III. Minimum 2 drives required 012-0153 \$199.95



A Division of
Scott Adams, Inc.

119

Send \$1.00 for our 16 page booklet
"Getting The Most From Your
Micro" All 16 pages are packed with
indepth explanations and printout
samples from the Maxi Series of ap-
plications programs.

THE BUSINESS DIVISION
BOX 3435
LONGWOOD, FL 32750
(305) 830-8194



Now It's Easy to Get Behind the Controls of a Radio Shack TRS-80®

Buy Our 16K Color Computer — We'll Give You the Joysticks at No Extra Charge!

What a deal! Our \$399.95 standard TRS-80 Color Computer now comes with 16K memory built in. And if you act right away it also comes with a pair of joysticks worth \$24.95! Just attach to your TV and pop in a handy Program Pak.™ Then take hold of the joysticks to chart your course through the galaxies, battling enemy aliens in thrilling games like Project Nebula or Galactic Attack. Or get more down-to-earth excitement with any of our dozens of other color action games.

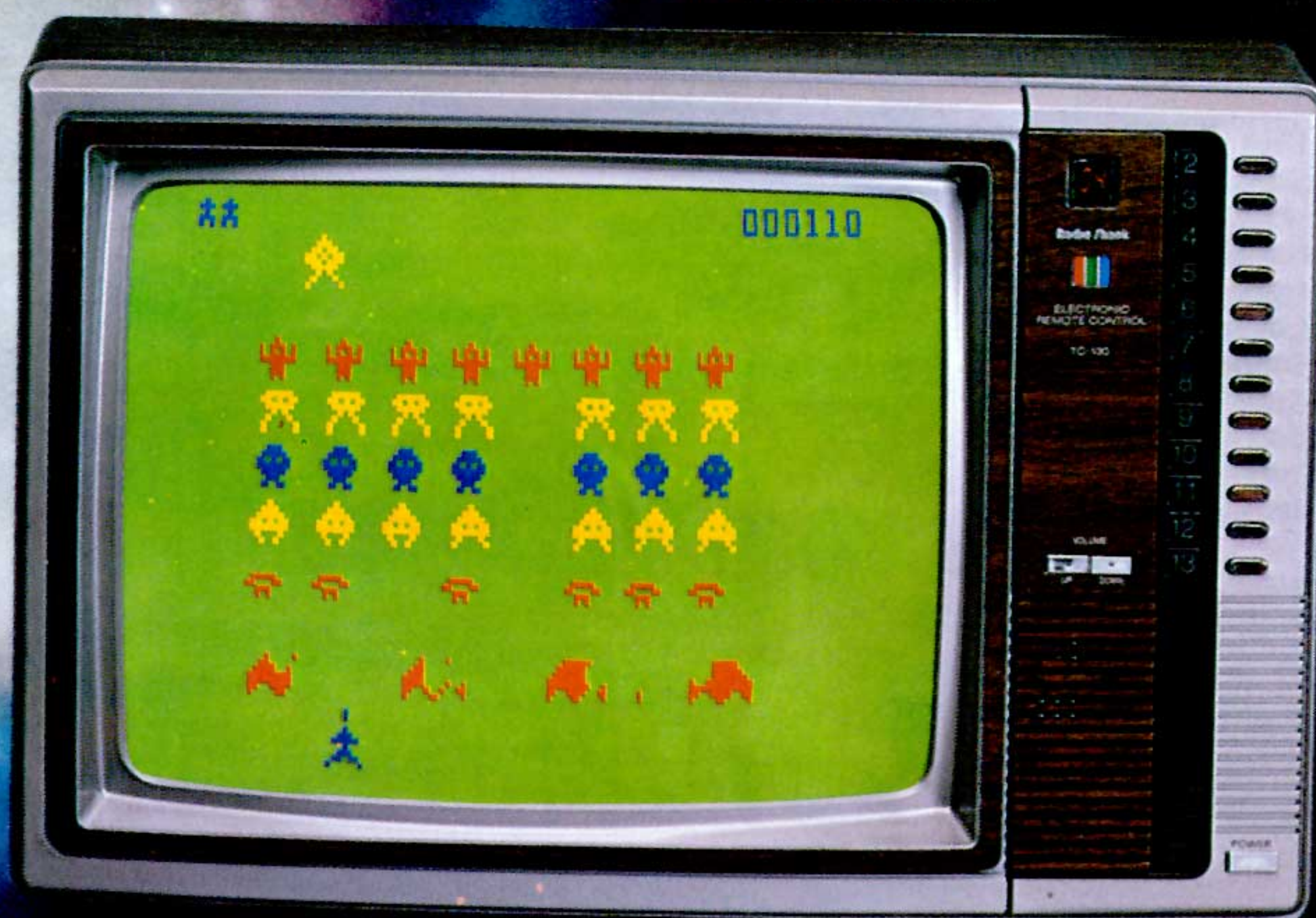
But that's not all. Your Color Computer can also take you on in chess, Roman checkers and backgammon. Feel like expressing yourself? Micro Painter or Art Gallery will turn your joysticks into "electronic paintbrushes" so that you can create beautiful color pictures and designs on your TV screen. There are Program Paks to teach you bridge or touch typing, help your kids with math, reading and music, keep computerized inventories of household items, and plan your budgets. Isn't this the perfect time to treat someone in your family to the fabulous TRS-80 Color Computer? Then hurry — this terrific joystick offer expires September 26, 1982!

Radio Shack®

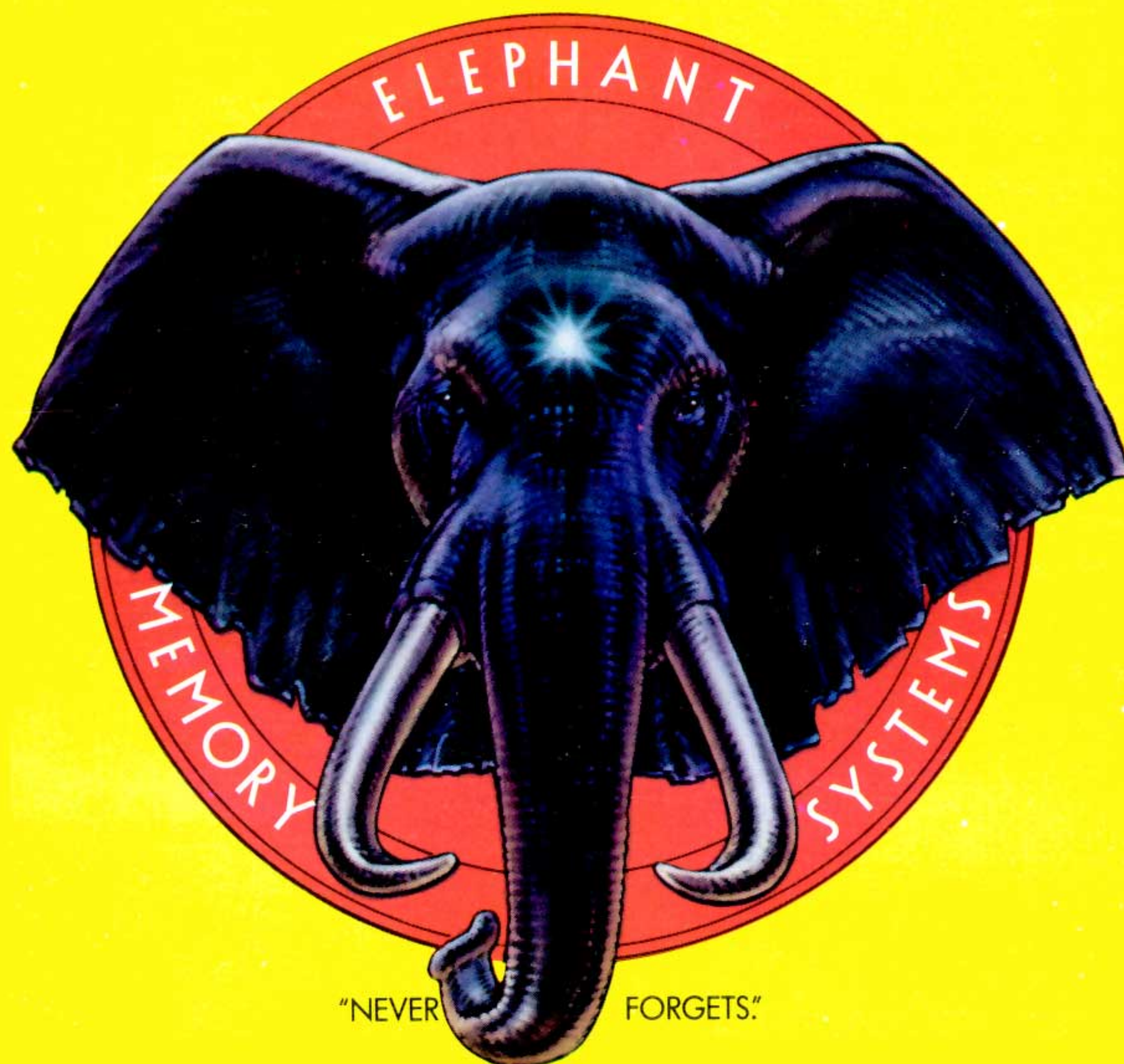
The biggest name in little computers™.

A DIVISION OF TANDY CORPORATION

Retail prices may vary at individual stores and dealers.



REMEMBER:



MORE THAN JUST ANOTHER PRETTY FACE.

Says who? Says ANSI.

Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all ElephantTM floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to

make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI . . .

We think you'll want us to make some Elephants for you.

ELEPHANTTM HEAVY DUTY DISKS.

For a free poster-size portrait of our powerful pachyderm, please write us.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021

Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.